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THE
ASIATIC SOCIETY OF BOMBAY
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PROCEEDINGS

OF THE

BOMBAY GEOGRAPHICAL SOCIETY.

NOVEMBER, M,DCCC,XXXVIII.

00160016

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PROCEEDINGS

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NOVEMBER 1838.

PAPERS, ETC.

I.—*Memoir on the River Euphrates, &c. during the late Expedition of the H. C. Armed Steamer, "Euphrates."* By James W. Winchester, A. M. Assistant Surgeon.

FROM THE MOUTH OF THE RIVER EUPHRATES TO KORNAH.

The river Euphrates, having its origin on the western side of Mount Taurus, is one continued stream till its junction with the Tigris at Kornah. When united, the streams change their appellations, and are denominated the Shat-el-Arab, or the river of the Arabs. At Mahumrah, where the Delta commences, the Shat-el-Arab divides into two branches; the western, navigated at the present day, and known by the name of Cossisa Bony, or Bouna, and the eastern, now not navigable, which is called Deree Bouna, from Deree, an island at its mouth.*

The bar at the embouchure of the Cossisa Bony, better known under the designation of Shat-el-Arab, or the Bussorah river, is not indicated by any land marks, but by soundings, and the discoloration of the water; nor is it until vessels have crossed the bar, where the soundings vary from two and a quarter to three fathoms water, that the first signs of the banks are observable in a low spit of sand, running out from the right bank; abreast of this, however, both banks become speedily visible, covered with tall reeds, and innumerable pelican. Ten miles above the bar, date trees begin to present themselves, and the breadth of the stream exceeds half a mile, while below, it is never broader than a mile. With the exception of the difficulty in crossing the bar, the stream of the Shat-el-Arab is navigable to vessels of considerable burden, till above the Delta, where,

* Vincent.

at a place called the "Debbas," two miles above Mahumrah, the channel is so shallowed by several small swampy islands, that ships drawing seventeen feet of water cannot pass through, but at spring tides. But above the "Debbas," the river again affords sufficient water for vessels of six-hundred tons proceeding to Bussorah, or even to Kornah. The average breadth of the river from the Delta to Kornah is six-hundred yards, and the soundings vary from five to nine fathoms. The influence of the tides extends to Kornah, but they cause no evident rise and fall in the river beyond Bussorah.

Both banks are clothed with forests of date trees, "Phenix Dactylifera," from near the mouth of the river, and numerous creeks, from fifteen to thirty feet in breadth run inwards, often upwards of a mile, irrigating the bank, which is flat, and divided into numerous compartments by deep trenches, which, as the tide rises, become filled with water, sometimes to overflowing, but always so as to keep the ground moist on which the trees are. The sides of these ditches, which average from four to eight feet in width, are covered with willows, and beneath the date trees, the soil is completely overrun with the liquorice plant, Glycyrriza Glabra, the root of which, is only used by the natives, in making a sherbet, notwithstanding it is more than one inch in diameter. Where there are no date trees, the soil is flat and chiefly alluvial, though it assumes in many parts, a sandy appearance. Soon after the fall of the waters, it becomes arid, and barren, whilst during the inundation it is green with innumerable grasses, intermixed with white and red clover—Trifolium; a few saline bushes show themselves, the chief of which is the Salsola Nudiflora, a species of soda plant, which is not only very common here, but all along the Euphrates and the Tigris, and Roxburgh says, it is capable of producing a very good fossil alkali. If the inhabitants were encouraged, much barrilla both for the preparation of soap and glass, as also for purification, might be obtained, which I do not doubt would find a ready market in most parts of the world.*

Above the Delta, the banks, especially the right, are thickly studded with gardens, in which are apricot, peach, pomegranate, lime and other trees, along with the vine; these, and the many tombs erected to Arab saints and shaiks, whose domes rise above the date groves, in which these gardens are, add much to the beauty of the wide and majestic stream of the Shat-el-Arab. This appearance of the river continues till above Bussorah some miles, when the gar-

* At Bagdad this plant is burned for its barrilla, with which a green glass is manufactured.

dens cease, and date trees, and extensive swamps, dry in the winter alone, occupy the bank till the river divides at Kornah, below which, the Choaspes unites its clear stream with that of the Shat-el-Arab.

From the bar of the Bussorah river to Kornah, no town of importance save Bussorah occurs. The banks retain, however, the ruins of several smaller towns, the principal of which is Mahumrah, destroyed some time ago by the Pasha of Bagdad, chiefly because it assumed to itself the power of importing and exporting without paying duty to the Pashalik.* The other villages, for their ruins mark that they cannot properly be designated towns, were ravaged by the late appearance of the plague, since which, they have not recovered their former population, nor heve their present inhabitants been able to repair the houses, which appear but as heaps of ruined mud walls. Besides these, among the date groves several Arab villages have lately sprung up, whose inhabitants possess boats of considerable burthen, employed in the exportation of dates. They are thickly populated during the date season—August and September—by numerous hordes of wandering Arabs, who come from the interior either to purchase or be employed in gathering the crop. There are others, who prowl about, for the purpose of stealing from the trees, the dates the villagers are unable to guard.

Bussorah, situated on the right bank of the river, and built among date trees, possesses none of its former importance. It is a fortified town, whose brick walls, fast falling into decay, enclose a much larger space than has ever been occupied by buildings. To extend, however, the enclosure of eastern towns, has always been a practice, prevalent even in ancient times, as it afforded ground sufficient to cultivate the necessaries of life, so that during any protracted siege, the inhabitants did not suffer from famine. Within the extensive walls of Bussorah, considerable cultivation still exists, irrigated by the waters of the Euphrates, and date trees all along the cultivated patches, are thickly planted, which here, as elsewhere, on the banks of the river, yield the greater portion of the food of the lower classes. The plague lately depopulated Bussorah, and since, it has neither increased its commerce, nor obtained any addition to its buildings; on the contrary, the latter have been fast falling into decay, and now more than two thirds of the town is a heap of ruins.

The bazars are still extensive, but do not present such an opulent

* A very recent attempt was made to revive Mahumrah, to which the Governor of Bussorah was accessory. This treachery, however, having speedily been brought to Ali Pasha's notice, a firman was sent from Bagdad during the perusal of which, its messenger in open durbar shot the Governor.

appearance as those of Bushire. The principal ones are those in which fruit and fish are sold, and these with the others are thickly crowded with coffee and water drinking shops. * The English intercourse by trading vessels is limited, and the display in the bazar of British manufacture, is less than what is observable in Bushire, or even in Muscat.

The approaches to Bussorah from the river, are by two creeks, defended by bastions at their entrance, whose banks are covered with mimosas, mulberry, jujube, trees, and the wild blackberry. They are navigable upwards of a mile by boats of nearly one hundred candies.

The whole soil around Bussorah is alluvial, occasionally effloresced with salt and nitre, capable with due irrigation of producing any crop, as is the soil within the walls, although it does not receive that attention requisite for the production of an abundance it would otherwise grant.

The population may be roughly estimated at twelve thousand, of whom not more than three or four hundred are Turks; the other inhabitants are Arabs, Persians, and Jews. The trade consists chiefly of the export of dates, salt, and horses, and the import of rice and wood from the Malabar coast. Ships obtain good supplies at Bussorah, and the climate, though sometimes oppressively hot, has been considered very healthy. Plague and cholera have occasionally appeared; but with considerable intervals between each visit.

From Kornah to Hillah.

At Kornah, one of the supposed sites of the garden of Eden, and one of the three Apameas built by Seleucus, in honour of his first wife Apama, now—although it was formerly a place of some importance—a small village, forty-seven and a half miles from Bussorah, and one hundred and thirty-seven and a half from the bar, the streams of the Tigris and Euphrates unite. Below their junction, the united stream is six hundred yards broad, while either river separately does not exceed three hundred in breadth. The ascent of the river Tigris is in a direction N. W. by N.; that of the Euphrates east and west. The word Kornah, in Arabic signifies a horn, marking the connexion with the Greek, Latin and English synonyme, and the rivers pursue a direction after their division similar to the branching out of a bullock's horns. This junction of the rivers of Mesopotamia, was known to

* But what most attracts the attention, is the peculiar construction of the bakers' ovens; they are domes open on one side, with the fire in the centre, on whose smooth inner heated sides, the thin cakes of bread are attached while in a moist state by their own adhesiveness, which is sufficient to keep them there till baked.

Ptolemy, who has much more correctly laid down their geography, than either Arrian or Pliny, who have given a separate embouchure to both the Euphrates and Tigris.

Till near Shoog Shookh, a distance of sixty-eight and a half miles from Kornah, the right bank of the Euphrates is swampy, covered with reeds, and, during the rise of the river, inundated; the left is studded very generally with date trees, among which a village now and then appears, though more commonly, only a few leaf huts are seen, surrounded by nothing like cultivation; flocks of cattle being apparently the only means of support the inhabitants possess. * Both banks of the river are, when the rise is at its height, below the level of the current, and mud dikes along the greater part of the left bank, prevent its being overflowed like the right; occasionally, however, these being destroyed, the country is covered by water with reedy vegetation, among which are a great many pelican, Pelicanus Onocrotalus, considered a sacred bird by the inhabitants. Sometimes the river rises above both its banks, so as only to leave them indicated by clusters of small grassy islets, with a few reed huts on them, while the expanse of water extends to the horizon, relieved only by clumps of date trees. This desolate waste continues till a few miles below Shoog Shookh, when the banks again become thickly clustered with date trees, and every reach of the river becomes more beautiful and interesting.

It was then the twilight shades of the lofty palm, the pelican swimming on the smooth clear streams, the huts of the Arabs, and their wild inhabitants, gazing on the steam vessel as she passed upwards, the occasional torrent gushing over the confines of the river, flooding the low land beyond, appearing through the date stems, like a great lake, with the now and then cultivated patches on the banks, on which grow the pomegranate, the apricot, and tamarisk tree, presented a scene new and striking. The impression experienced in viewing the immense inundation led the mind to the Nile, the vivifying influence of whose waters renders Egypt one of the richest

* In the vicinity of one of these villages, a few miles above Kornah, the Arabs of the Montefique tribe, then at war with the Pasha of Bagdad, had an outpost, and by means of a boat, and several large bundles of dried reeds and date leaves supported strong chains across the river, to prevent the Turkish admiral Bel Mos passing up his fleet, which consisted of four brigs to Shoog Shookh. As the steamer approached this blockade, several hundred Arabs were observed on both banks, but their chief, Shaik Faris, assured us that they had no hostile intentions towards the English, on the contrary that as soon as the wind become such as to prevent the fleet, at anchor two miles lower down standing up the river, they would slacken the chains and enable the steamer to pass; the wind fortunately in the course of the night changed, and the Euphrates passed upwards.

countries in the world. Here no similar advantage accrues from the rise of the waters—the desert exhibited is never otherwise, than in affording on the recession of the water, better grazing to the cattle of the wandering Arabs, and in fructifying the date tree, often the only food of a people who have no fixed habitation.

Shoog Shookh, "the market of shaiks," the capital town of the Montefique Arabs, and the chief emporium of trade in this part of the east, on the left bank of the river Euphrates, is a walled town, now containing from five to seven thousand inhabitants. Previous to being devastated by the plague, it contained a population of upwards of ten thousand. Opposite the town the river is about one hundred and twenty yards broad, with a current of two knots an hour. The channel is deep, with steep banks, not more than a couple of feet above the level of the stream, along which are many gardens, well supplied with vegetables, fruit and other trees, such as the Salvadora Persica, mimosa Arabica and tamarisk, which first begins to occur at this part of the river. Twelve miles higher up the Phenix Dactylifera ceases to predominate, the low flat banks being entirely covered with jungle of the salsola and tamarisk, in which are great numbers of very large wild hog, jackal, and occasionally lions. Above Shoog Shookh, there are several large villages of Montefique Arabs, the largest of which is called Fogleah, and possessed of upwards of four thousand five hundred huts; in their neighborhood is little or no cultivation, but large droves of bullocks, sheep and goats, are seen, while horses of superior appearance are plentiful. In one village in the immediate vicinity of Shoog Shookh, the inhabitants consider John the Baptist the Prophet, and not Mahommed; independent of this belief their religion is entirely Moslem. From the mouth of Hie, near which are the ancient ruins of Maggias, the banks of the Euphrates are dull, uninteresting, and without inhabitants, and the river becomes more winding and narrower, marking the proximity of the Lumloome marshes.

The first day's passage of the steamer Euphrates, through the Babylonian marshes, was auspicious in the extreme. Nearing them the river gradually narrowed, and commenced overflowing its banks in every direction, while at the same time it ran with a current of not less than four knots an hour, and often much more round the short and abrupt turnings the stream takes. The "Euphrates" steamed well; and was got round the sharp and abrupt windings of the river, chiefly by checking her by dropping the anchor the moment she neared the bank or struck, by which means, she was made to swing with

the current, and the vessel's head was often thus placed in the centre of the river; when in this position, the steam was immediately got up, and she generally went on clear of each bank, although the stream is not broader than sixty or seventy feet, frequently less, and certainly at the bends of the river, not much more than the length of the steamer—one hundred and five feet. It was the steep soft alluvial banks alone, that permitted her passage upwards.

The marsh is entirely covered with water—save here and there, where a few grassy islands exist, and where the reeds rise above the surface: it extends to the horizon on all sides, and presents an appearance of desolation, which the few miserable inhabitants at present residing on its dry parts but add to.

One the 22nd of May, the remainder of the Lumloome marshes were passed through by the steamer, with comparative ease; the boat was only once in difficulty from shoal water in rounding a point, but not so as to require the getting out of warps, &c. When clear of the marshy ground, and the banks began to get high, in the marsh they are often below the level of the river when at its height, and show some signs of cultivation, the turnings of the river became more abrupt, and the current rushed round them with a force of not less than six miles an hour. This, and the extreme narrowness of the river render the passages most intricate and difficult: often the strong current took the steamer, and she refused to answer the helm, flying round with its force, unless checked by the anchor suddenly being cast loose so as to be driven upon the opposite bank. In this manner, two anchors were lost, the first had a chain cable half an inch in diameter, the second one three quarters of an inch. The second anchor was lost in the following manner: at the last and greatest difficulty contended with, as the steamer was rounding a sharp point, where the current ran with unusual violence, so as to agitate the whole breadth of the stream with an appearance of shallow water, while the depth was very considerable, her helm became useless, and from the vessel's length, the power of the current acted so as at once to sweep the boat bodily round. The moment she was observed to give away to the stream, a large anchor was dropt, length of cable was unsparingly given, but it being impossible to do so with sufficient celerity, it broke, and the ship flew on the bank. She was speedily rid of the bank, and after one or two ineffectual attempts to round the point by the full force of steam, at last happily succeeded, by being purposely sprung with the current's full force and that of the steam (which, though instantly stopt, still acted) on the left bank above the point round which the current swept; from its soft and muddy nature, no

injury was sustained, and no further impediment occurred to the steamer's passing upwards. The stream continued very tortuous till above the town and fort of Lumloome, or Musahay, now a mass of ruins, where the river divides, one branch running up past Lumloome on the left bank, and the other towards Hillah on the right bank. After this division, the river becomes broad, and in every sense of the word, a navigable stream, with high and steep banks clothed with thick and interminable jungle of tamarisk, intermixed with the wild blackberry and caper bush, Capparis Spinosa, and a vast variety of the tricozanthes, with occasionally the liquorice plant, which here grows to more than the height of a man, among which old ruins or the remains of some ancient canal, which formerly communicated between the two rivers, are seen. Above Esmay Aynee,* the river increases to eight hundred yards in breadth, and its high alluvial banks have in them numerous holes, where king fishers of a white color, beautifully marked with black, have their nests, while the turtle dove, the blue jay of India, the black, and grey partridge, hawks and numerous varieties of small birds, occupy the jungle.

Thus the passage of the Lumloome marshes was accomplished, the greatest barrier to the navigation of the Euphrates, without the intervention of any difficulty, which for a single moment caused a hesitation, or the shadow of a doubt as to the practicability of success in a steamer the size of the "Euphrates"—one hundred and five feet long, and nineteen feet beam. I am therefore induced to believe that with a vessel shorter, and of more power, and consequently better adapted to the intricacies of the river at this part, the passage of the Babylonian marshes would always be certain.

The approach to Hillah is beautiful, like that to Bussorah, from the gardens on each bank, which besides those trees already named, are full of the fig tree, "Ficus Carica," and a beautiful foliaged poplar," Poplus Euphratica."

From Kornah to Hillah, the average current of the Euphrates is three knots and a quarter; the average breadth about two hundred and fifty yards, with a depth of channel varying from two to five fathoms.

From Hillah to Hit.

Hillah four hundred and thirty-eight and a half miles from the mouth of the Euphrates, and five miles below the site of ancient Babylon, is built upon both banks of the river, and connected by a bridge com-

* An Island.

posed of twenty-eight boats, made of hides coated with bitumen. Mr. Rich measured this bridge, and found it to be four hundred and fifty feet long. The town is inhabited by Arabs and Persians, and governed under the Pashalik of Bagdad. The whole population, including Turks and Jews, does not amount to ten thousand. Hillah is entirely built of brick, cemented with lime, or mud, and does not afford, with the exception of one lofty minaret, whose sides are coated with a vitreous matter of a blue color, any large or elegant public structures. The houses are low, with flat roofs, and their inner court yard is generally below the level of the streets and lanes, which abound more with filth, than the towns in the east generally do. The bazars are extensive ; but they are mostly occupied with coffee shops, and nothing in the shape of English manufacture exists.

Beyond and within the walls, which are considerably decayed, and unfit for the purposes of defence, are numerous gardens, all irrigated by the waters of the Euphrates in a manner something similar to ancient Babylon, regarding which Quintus Curtius remarks: " The buildings of this city do not reach the wall, but are at the distance of an acre from them. Neither is the whole city covered with houses, but only ninety furlongs, nor do the houses stand in rows beside each other, but the intervals which separate them are sown and cultivated, that they may furnish subsistence in case of siege." In these, wheat, barley, melons, cucumbers, &c. are cultivated, along with date and fruit trees. Many of them are the residence of Arabs, living in tents of black horse cloth—a mixture of the half civilized and unsophisticated sons of nature on the spot, where once the wealth and luxury of the world was. Beyond Hillah, on the plain of Shinar, the Birs Nimrod or tower of Nimrod is the most prominent and striking object visible, but it has been so minutely described by Rich, Porter, and others, that it is unnecessary to do otherwise than merely allude to it. The plain between it and the river is cultivated ; numerous remains of old canals take from its flatness, and contrast with the limited possessors of the soil at present, and those who in former days, changed the course of a great river to fertilize the surrounding country. For many miles above Hillah, on each bank, are huge mounds of broken brick and alluvion, with vast hollows marking the position of old canals ; those few which still permit the passage of water, have their termination in large lakes and morasses : but are these the remains of what was thought to be the work of former Assyrian kings, and which were said by Herodotus to be equal in extent to an inland sea ? I can only hazard conjecture in favor of their being the remains of such ancient excavations, as

on the right bank, about thirty-six miles above Babylon, the canal, which was said to connect the upper end of these with the river, called Pallacopas, still exists, and contains water as far as the eye can reach. All these canals are more perfect in their remains than any of the buildings of Babylonia Antiqua, and they evince how great and mighty the people were, who could leave such indications to posterity of human ingenuity and labor.

From Hillah to Felugia, the banks are flat and alluvial, with considerable cultivation and numerous herds of goats, sheep and bullocks; but with the exception of Moseabe, a small and populous town, no place of importance occurs, till below Felugia, where is the site of an old fortress called Aboo Grahb, of which nothing remains but the heaps of alluvion on which it was elevated. The ruins of a brick fort, point out the Felugia of Xenophon, which Plutarch says, is five hundred stadia above Babylonia, and which is one hundred and three and a half miles from Hillah. Higher up is the field of Cunaxa, where the younger Cyrus was slain; but nothing marks its site. About five miles from Cunaxa, the right bank is level and cultivated, with a low range of white sandy hills, running north and south, about seven miles from the river—the commencement of the desert. During the rise of the river, the swampy inundated state of the country is most extensive above Felugia, and is thus described by Mr. Rich. "The most remarkable inundation is at Felugia, twelve leagues to the westward of Bagdad, where the Euphrates breaking down the dikes, which confine its waters, they flow over the country, and extend nearly to the Tigris. On May 24th 1812, laden rafts were brought from Felugia to within a few hundred yards of the northern gate of Bagdad." According to Rennell, there is a canal called Isa, which emanates from the Euphrates at Felugia, and enters the Tigris at the head of old Bagdad, the only one of the four of the Caliphate which remains open and that only during the floods; whether this refers to a canal called Aboo Grahb, near the mound already mentioned, of the same name below Felugia in a straight direction three miles, and which now runs inwards to the plains near Bagdad, without communicating with the Tigris, or to the canal Sugglavya, in a direct line five miles above Felugia, and which communicates with the Tigris, I know not, although I suppose Sugglavya must be the canal "Isa" referred to. The same author, in his work on the Geography of the Anabasis, states that the Euphrates, on its entering into the plains of Babylon below the supposed Pylæ, runs on a higher level than the Tigris, and that the Tigris is more elevated than the Euphrates in the

Lumloome marshes. Both of these statements are proved from the direction which the canals take; but Lieutenant Murphy's experiments on the level line between the two rivers on the plains of Bagdad, gave but a few inches difference, insufficient in a long canal, alone to influence the course of a stream, which in the Sugglavya runs with an average velocity of not less than three miles.

Long lines of tents, of the Dalem Arabs, who, as the steamer passed, gathered on the banks, dancing and shouting rude verses to our success, thus testifying their admiration and proving we were among a people not less friendly than well intentioned, surrounded by extensive cultivation, occupy both banks, which are still alluvial. The right bank continues flanked by a low range of flat topt irregular hills, of a white color, evidently sandstone of the newest formation, with perpendicular sides, but more generally running down in gradual rounded slopes to the alluvion; these are continued to a lofty minaret, called Imashaya, built on an elevated point of rock, close on the river. From this minaret, both banks of the river become rocky, and I take its site to be the spot known as the Pylæ or gates, for after leaving them, the country becomes barren, and as incapable of improvement as any part of the desert of Arabia, and the river's current is much increased in rapidity from its being confined by high land on each side, until above Hit, whose proximity is indicated by numerous arched gateways, built into the force of the stream from its edge, in which are immense undershot wheels, moved round by the power of the current, so as to raise water up in small clay troughs on a level with the tops of the arches, from whence it is conveyed in courses, to irrigate the soil along the elevated banks of the river. Five miles above Hit, two of these gateways narrowing the stream, increased its force, so as to prevent the steamer passing upwards, even though the vessel was lightened seven inches and her engines were in the highest possible order. Where this barrier occurred to the navigation of the river, it is nearly two hundred yards broad, but the two gateways project from both banks into the stream directly opposite each other, about forty feet from the one side, and sixty feet from the other, having, independent of these visible obstructions, their foundation, and a line of dead wall extending very considerably, giving to the current a force of seven miles an hour, and causing it to assume a line of elevation above where the dead wall is, from which the steamer uniformly turned back. Colonel Chesney mentions them as follows: "But what most concerns the subject of this memoir on the Euphrates, is the existence of a parapet wall, or

stone rampart in the river, just above the several aqueducts; in general there is one of the former attached to each of the latter, and almost invariably between two mills on the opposite banks, a wall crosses the stream from side to side, with the exception of a passage left in the centre for boats to pass up and down. The object of these subaqueous walls (mistaken by Alexander the Great for means of defence against his irresistible legions) would appear to be entirely with a view to raise water sufficiently at low seasons to give it impetus, as well as a more abundant supply to the wheels, and their effect at those times is to create a fall in every part of the width, save the opening left for commerce, through which the water rushes with a moderately irregular surface. These dams were probably from four to eight feet high; but they are now frequently a bank of stones, disturbing the evenness of the current, but always affording a sufficient passage for large boats at low seasons, and ceasing to be very perceptible, except by the broken surface after the water is swollen." These aqueducts were never looked upon as a barrier to the river's navigation, nor do I know if they yet are so, for at the period the attempt was made to pass by them, the stream was considerably swollen by a fresh, indicated by a diminished temperature of the water, and a rise beyond its usual confines. The force of the current daily diminishes, as the river falls, so that in time these arches would in reality have been little or no obstruction. But independent of waiting for this fall, warps might always be used to force steamers past, (native boats thus daily ascended,) were it an object to Government or commerce to navigate the Euphrates above Hit. The average breadth of the river from Hillah to Hit is two hundred yards, with a current from two, to six, or seven knots an hour.

The Geology of both banks of the River Euphrates, in the vicinity of Hit.

Hit, the Is of the ancients, on the right bank of the river Euphrates, is built on an elevated and detached rock of limestone, six hundred and thirty miles above the embouchure of the united streams of the Tigris and Euphrates, and nearly fifty miles above where the rocky banks of the river commence.

The town, surrounded by a stone wall and deep ditch, with the sides of the rock on which it is placed often perpendicular, still assumes an appearance of considerable strength, indicating that it must have been a strong hold of great importance in former days. Now it is in considerable decay, with not more than six hundred houses

built of limestone with flat roofs. It possesses no bazars, and the streets are narrow. The population is Arab, and does not exceed two thousand five hundred. The general caste of countenance of the inhabitants, is distinctly Jewish; but this is all that remains to mark the former connexion between Hit and Jerusalem.

Beyond Hit, is an extensive plain, broken by occasional ridges of elevated ground and solitary hills, not of great height, but in a geognostic point of view, highly interesting. Between the commencement of these, the and back of the town, is a broad open valley, extending to the right and left several miles, on which are numerous small running streams, having their origin either from springs in the earth, or from the petroleum pits in the adjacent hills: these are uniformly saline, and with the exception of a few stunted rushes, deny all vegetation to the soil, which is soft and sandy. This water, immediately in the rear of the town, is collected in square or irregular compartments to evaporate by the heat of the sun, in order that it may leave its saline impregnation behind, which is gathered and used by the natives as salt, notwithstanding it contains a large portion of nitre. These salt ponds cover several acres, and petroleum is seen to issue from the earth, so as often to render impassable the pathway along them. The appearance of the salt crystalized is very beautiful, and the difference of specific gravity, indicating the quantity of saline impregnation, causes the water to appear as if divided by a thin plate of glass, the upper layer of water being clear and limpid, occasionally ruffled by the breeze, while the lower is viscid and of a light straw color; agitated, both layers mix like oil and water, quickly resettling.

The alluvion along the bank is not of great extent, but pebbles silicious or quartzy, brought down by the power of the torrents on the mountains higher up, are deposited beyond the boundary of the alluvial soil, and these mixed with calcareous debris, carried from above by the action of the river and here left, mark that the river's forming power has been extended beyond the present alluvial range.

The structure of the hills and ridges near Hit, differ from those some distance beyond, which are composed of flœz limestone, distinctly stratified horizontally, with flat and extended summits. The plain in their immediate vicinity is calcareous sand, interrupted by huge tabular masses of limestone, rising above its level, and fragments of the same stone, (which also cover the hills), intermixed with porous calcareous Tuffa, whilst its lower parts are covered with saline efflorescence, and are entirely sandy.

The hills close to the town, beyond the salt ponds, are those in

which petroleum is found, for which Hit is famous; they are of very peculiar formation, and principally consist of ridges and solitary hills, composed of sand, containing a large proportion of calcareous particles, generally disintegrated, though in some places assuming a distinctly stratified appearance. The strata are of very small breadth, varying from a light yellow ochre, to a greenish grey color, running in a horizontal direction, but most frequently in a contorted one, so as to follow the line or general direction in which the hill or ridge runs. Such strata are mostly observed near the summits, while the lower part of the ridges are merely accumulated masses of calcareous and sandy particles, of an argillaceous appearance, easily broken up, considerably disintegrated on the surface, and mixed most abundantly with mica and sulphate of lime. In parts, occasionally irregular hardened argillaceous masses are cemented together so as to produce an amygdoloid appearance.

The most extraordinary appearance which these hills take, however, arises from their being intersected with repeated horizontal strata, from three to six feet in thickness, of gypsum, which often run not in one, but in two or three detached veins on the bases I have described, without contortion, and in several instances capping the summits so as to form a superincumbent mass. Gypsum is only found in these positions, or detached in blocks on the sides and summits of the hills, in which it appears as above described. In all it has the same character, being easily splintered, with translucent edges, and a pearly white, fibrous, splendent looking mass.

Frequently it has crystals of sulphur imbedded on its ragged weather worn surfaces, and sometimes the gypsun is found in crystalized masses, or impregnated with petroleum causing it to assume a black appearance. No limestone, such as obtains in the hills already mentioned, occurs in those which have the gypseous strata, but their hollows* abound with petroleum which issues from their surfaces in considerable quantities.

On the summit of one detached hill, about eighty feet above the level plain, a few scoriæ were observed, but no other appearance of volcano. Nothing like lava nor any approach to basalt exists, and I was unfortunate in not finding any fossil remains, although I anxiously directed my attention towards obtaining them.

Among these hills are the bitumen, or rather the petroleum springs of Hit, famous for having been visited both by Alexander the Great, and the Emperor Trajan. The principal spring, the only one

* In all gypseous countries remarkable funnel shaped cairties are observed.

now existing, is in a funnel shaped hollow in one of the gypseous and marly hills. It is forty paces round, and filled with a substance of a dark blackish brown color, in the centre of which bubbles up water, which floating off, runs down to the salt ponds, where evaporating, its saline impregnation is left behind. The water sometimes rises in jets, a foot and a half high from the centre of the pit, at intervals, while at other times it bursts out in considerable quantities, raising the petroleum into large blebs, which bursting, the water flows out with a gurgling noise. Besides this spring of water from the centre, smaller quantities issue from different parts of the pit.

The temperature of the water as it rises, was found to be 74° F. while the thermometer stood in the shade at 85°.

The centre of the pit is described as deep, but its edges permit the people who collect the petroleum to stand in it above their knees, so that they with considerable facility roll up the tenaceous substance into masses, which are removed to dry in the sun; when thus hardened it is used chiefly for fuel to burn limestone in. Close by is a lime kiln in operation, as well as several in the neighborhood ; in them, a very small earthy residue is generally left, and the flame burns with a strong heat and light. The petroleum, notwithstanding the quantity daily withdrawn, always continues at the same level, and the opinion of the natives is, that the supply in this pit is inexhaustible.

As has been mentioned, petroleum or mineral oil issues from the earth in small quantities from almost every hollow in these hills, and in the surrounding plains it also appears, but never in any great abundance. It feels very greasy, and is handled, provided the fingers are wet, without adhering; if on the contrary the hand be dry and force used, it sticks like pitch. As it first rises out of the earth, it is of a brownish black color with a greenish tinge semitransparent. It rapidly becomes opaque and hard, in which state it is easily broken with a shining resinous fracture. It is lighter than water and rapidly inflames.

This is the Bitumen Liquidum of Pliny, different from the *Ναφθα* * and *Ασφαλτος* of the Greeks, and it answers to the description of the petroleum or mineral oil, found in Moldavia, " where springs of it flow from a track, where there is an alternation of beds of sandstone, marl, gypsum, and rock salt."†

Its present uses among the natives, independent of its being

* There are springs of naphtha, about ten miles below Hit, at a place called Nefta; higher up the river, bitumen is found in veins, in considerable quantities.

† Jameson.

made a fuel to burn lime in, which is sent from Hit in some quantities to Bagdad, are to cover boats, preserve wood from decay, as well as to render impervious the irrigating channels from the gateways to the patches of cultivation along the river. It is also exported in very considerable quantities.

The plain of Hit is very scantily supplied with vegetable productions; those found are either of a saline or aromatic nature, and the chief cultivation by irrigation is wheat, surrounded by a few abortive date trees, the only wood in the vicinity.

The country on the left bank of the river, which is elevated above the level of the stream, from ten to twenty feet, is sometimes alluvial and sometimes rocky, and assumes beyond the line of cultivation, which varies from a quarter to half a mile in breadth, the following physical aspect.

Upwards of a mile in breadth, and of undetermined length beyond the irrigated soil, are mounds of alluvion, intermixed with pebbles so thickly as in some parts to consist of these entirely. This breccia is easily broken up, and possesses no firmness of texture to entitle it to be denominated otherwise than irregular mounds of intermixed pebble and alluvion. The pebbles are small and consist of quartzy, and argillaceous matter, varying in color and shape : among them, are pieces of flint, similar to what is found in beds of chalk. Beyond these mounds, the surface of the soil becomes broken by the water courses of torrents, whose banks are formed of a loose calcareous sandstone, with numerous veins of a thin micaceous matter, running in a horizontal direction, as well as very thin veins of gypsum, of a honey-comb appearance. The basis itself is not distinctly stratified, and in general above it, there exist marks indicating the thickness of the pebble and alluvial deposit to vary from four to twelve feet.

Following the course of the largest of these torrents, dry the greater part of the year, the breccia deposit along the top of the bank is lost, and thin layers not worthy of the name of strata, of a very soft limestone, cover the soil. These, frequently broken up, cover the ground with loose irregular masses, which extend over almost the whole country, till advancing by gentle, but irregular slopes towards a range of hills, about two hundred feet above the level of the river, and two miles distant, the pieces of limestone increase in size and frequently form large elevated masses resting on calcareous sandstone. The hills themselves, are composed of crystalized limestone, of a soft nature with an irregular and shining fracture. Their formation is tertiary, stratified horizontally, and rests on a basis

of sandstone, which is frequently thrust upwards so as to leave the upper part of the ridges in some places only of limestone.

The tops of the highest ridges display marine shells, of a small size, imbedded in the calcareous mass. These are the only organic remains to be found: several caves and hollows in the sides of the hill occur, but none of them are of large size, nor do they present any thing interesting.

From the highest point, the whole country presents a sterile and desolate appearance, highly irregular in its surface, and utterly devoid of vegetation. Even the bank of the river shows little vegetable life; a few abortive date trees, and stunted trees of the Poplus Euphratica with tamarisk, intermixed with Capparis Spinosa, and low thorny aromatic shrubs, are all that obtain beyond the cultivation, which is entirely wheat, barley, and the Sesamum Orientale. The approach to a dry and barren waste, which can never be improved by the most powerful arts of human industry, and which Xenophon thus described, "The country was a plain throughout, as even as the sea, and full of wormwood, and if any other kind of shrubs or reeds grew there, they had all an aromatic smell; but no trees could be seen. Bustards and ostriches, antelopes and wild asses, appeared to be the only inhabitants of the desert, and the fatigues of the march were alleviated by the amusement of the chase."

FROM THE EUPHRATES TO THE TIGRIS, BY THE CANAL OF SUGGLAVYA.

The entrance to the canal is about forty feet, with a current of nearly four miles an hour. Its banks are low and flat, covered with the liquorice plant, growing to the height of ten feet, often with a root four and five inches thick, excluding, save a few tamarisk bushes and long grasses, every other vegetation. The banks of the Súgglavya are steep, and not elevated above the level flat of the surrounding plain after the few first miles of the canal, nay, they are frequently lower, a fact which proves, with the general appearance throughout, that the greater part of it is a natural and not an artificial canal. In the plain, the remains of several old canals are seen in the distance, whose banks are often elevated forty or fifty feet, and present a gravelly appearance; no similar elevation occurs in the Sugglavya, on the contrary, where the liquorice plant and tamarisk cease, the surrounding flat of grass is equal and unraised in any one spot, a tract often unbounded, on which numerous herds feed in the vicinity of the black tents of the nomad races, who inhabit them. These people looked upon the steamer with astonishment,

and on one occasion, a party came down to the bank, with drums beating and a sword dancer in advance, to ask us to a marriage feast; many of them were well clothed, but the trackers, who accompained the steamer possessed nothing to cover their bodies, but one piece of coarse woollen cloth, sometimes worn as a cloak, sometimes simply wraped round the waist, and, when in the water, formed into a ball, which they fixed on their heads. They are generally Herculean figures, though not tall. The canal which is about seventy miles long, is very narrow and tortuous during its first two thirds; in its last, it becomes straighter and often as broad as fifty yards, with banks flanked by high reeds, with a stem several (from three to five) inches in diameter, and in height not less than twenty feet. In the vicinity of Bagdad the Sugglavya enters a large lake, which contracts in a canal called the Mosade, previous to entering the Tigris five miles below.

The navigation of this canal, was accomplished in four days, in the following manner. The steamer entered the Sugglavya, stern foremost, and she slowly passed down the numerous and abrupt windings of the stream, aided by native trackers, frequently grounding on the steep bank; but, by the aid of poles and ropes, which the trackers held, uniformly got off, without any great damage, though at the expense of considerable delay. The stream in force was not less than four miles an hour during the whole of the first day's progress, and its turnings, often at right angles, were most numerous for about eight miles, when they diminished, so that the steamer was able to go on with precaution a-head. Still she frequently came upon the bank, striking so hard and fast, that hawsers attached to anchors fixed on the opposite bank, were required before she could be placed in the centre of the channel again. The second day's progress was equally tedious, the vessel slowly and not without constantly striking from one bank to the other, sometimes stern first, sometimes broad side down the current, and seldom in her proper position, got down the canal about five miles, when she grounded on a shoal bank, from which, after five hours hard and unremitted exertion, she was bodily hove off. Scarcely however, was she rid of this bank, than again grounding, the steamer remained fast during the remainder of the day and the night, nor was it until a renewal of labor the following day, that she was hove off into the stream, shortly afterwards again to ground. On the fourth day she grounded, as she passed the remains of an old bridge at the entrance of the Mosade, by which the steamer proceeded into the Tigris. In this manner was accomplished the carrying of an armed vessel from the one river to the

other, an event which has not occurred since the days of Trajan and Julian—a passage, which produced considerable moral effect on the natives of this part of Asia, impressing them with high ideas of British power.

From Bagdad to Bussorah.

The steamer remained at Bagdad a few days, and on the 24th of June, again got under weigh to return to Bussorah, from a place called Gorara, five miles in a straight direction below Bagdad. Passing the remains of Selucia, opposite to which on the left bank, is Ctesiphon; the only evidence to mark the site of the Greek colony, is a few alluvion mounds, irregularly disposed close upon the bank of the Tigris, while Ctesiphon has the tank Kessarah, and an extensive triangular wall, still in tolerable preservation. Below Gorara the gardens of Bagdad cease, and the country is flat and occasionally cultivated by irrigating wells at which bullocks are employed. The river itself is wider and nobler than the Euphrates opposite Babylon, while an occasional island occurs, on which the water buffaloe and other herds are on either bank ; extensive mounds are observed in the distance on the plain, rising sometimes to the height of hills, but generally the whole is flat and covered with the soda plant. The rate of the current is about three miles, and the steamer navigated close to the bank, which bore marks of the river having lately fallen about six feet. Below Ctesiphon, the banks of the Tigris are less cultivated, and exhibit fewer signs of being inhabited than those of the Euphrates; the everlasting tamarisk clothes both with a thick jungle, rendered impassable by numerous creeping plants, the caper bush, and lion grass. Never does the tamarisk assume the appearance of a tree, and its small branches alone form the fuel of Bagdad ; among these jungles the lion abounds, and we saw towards sunset three, basking on the river's edge; so independent were they that though fired at, they did not move.

Early in the morning of the 25th, part of the range of the Kuzistan mountains was visible, and about six o'clock, the steamer was brought up alongside the left bank, near an encampment of Montefigue Arabs, who offered us sheep, &c. for sale. Their tents of black worsted cloth, are on an extensive grass plain, surrounded by large flocks of sheep, besides bullocks, horses, and innumerable asses. The plain bears marks of having been lately inundated, as most parts of the banks of the Tigris hereabouts do, which, as the inhabitants are much more nomad on this than on the river Euphrates, may

account for the scanty population. Coose, a small village of about thirty reed huts on the left bank, was passed, and about two hours before sunset, the Kuzistan mountains were neared, running parallel to the river on its left bank ; their general aspect is similar to those in the Persian Gulf, with which they are connected. Their nearest approach to the Tigris appears from their base to be about twenty miles. The right bank is flat and extended with numerous Arab encampments, surrounded by small patches of cultivation—entirely wheat and barely—with the exception of one large clump of poplar trees, among which is a tomb of an Arab Peer, or saint. The name of this spot is " Mugizil," place of washing, to which bodies of Arabs are occasionally brought to be washed, previous to interment. Anchoring during the night, the vessel got under weigh at day-light, passing during the early part of the day a place called Ali Shergi, where, among a cluster of poplar, is an Arab encampment; the whole of the country is flat and very uninteresting. Colonel Campbell, in his journal published 1755, says, " The river itself is grand, but the country furnishes scarcely an object for reflection. I do not remember, he adds, to have ever passed through such a vast extent of country, so uniformly dull and uninteresting, or to have spent eight or ten days, with so little to give birth to a new idea " After the lapse of more than half a century, it has still the same aspect of extended sameness, inhabited by the Aboo Mohamed Arabs, who are justly esteemed the most barbarous and wildest of the tribes of the lower part of the rivers of Mesopotamia.

On the 27th of June, about noon, the " Euphrates" came to an anchor, opposite the town of Bussorah, having performed at an average rate of thirteen miles an hour, the voyage down the Tigris, a river, which at all seasons is navigable.

I cannot conclude this memoir, without remarking on the native population on the banks of the Euphrates. They posses little of the apparent civilization of those living in fixed habitations, but they have much primitive simplicity, and showed on every occasion, when intercourse was held with them, a regard towards, and a desire to conciliate us, which, from the independent character generally ascribed to the Arab, I was not led to expect. It was not only in personal dealings with us, but in their crowding the banks, waving their colors, beating their drums, and shouting success, that they showed their respect to us, and, I am certain, with a native population so docile and friendly as they uniformly appeared, there is little to prevent commercial intercourse and rapid civilization. The fleeces of their extensive herds of sheep and goats, would alone form a valua-

ble article of traffic. That softness of the fibre of wool, of so much importance, uniformly exists; indeed, the wool of this part of Arabia has always been noted as superior on account of the great length of its staple, as is the wool of all sheep pastured on rich, argillaceous soils. Herodotus describes the Arabian sheep, distinguishing the two sorts of which the breed is composed, viz. the long tailed and broad tailed. The rich fleeces of Asia Minor, particularly those in the territory of Miletus, were considered by the Greek the finest of all, most likely because they confounded with the native fleeces of Miletus those of Arabia, which is finer than any I have seen from the central and upper parts of India. Wool, camel and goats hair, would always form a great staple commodity in this part of the world for exportation, and be greedily exchanged at the highest advantage for piece-goods, and other articles of imported commerce from England and India.*

To write of the climate on the banks of the Euphrates from Bussorah to Hit, and of the country through which the canal of Sugglavya passes, requires much more observation than I have been afforded; but the register of the thermometer and barometer, appended to this paper, may afford some idea of its nature.

The change of seasons has generally been looked upon in this part of Asia, and in the Persian Gulf, as the most sickly time. The latter end of May and the month of June have uniformly been marked by increased sickness in the crews of the Government vessels, serving in the Gulf of Persia, and there exists no doubt in my mind from the many circumstances known to me, that fevers in the Gulf have their origin in atmospheric changes, which influence fever throughout its whole course, and cause it to assume a type often very fatal. The difference of latitude is so small between Bushire and the part of the river Euphrates the steamer ascended, that the range of indicated temperature can exert little influence on the health of a crew of Europeans, and the changes of seasons must be nearly at

* At present I am not aware, that any wool is exported from this part of the world, for the inhabitants do not shear the fleeces, but content themselves with gathering what falls from the animal. If therefore, it forms a part of native trade, it must be so small as only to relieve the country of a portion of what it can so abundantly produce. Attention to this branch of commerce is well worth the notice and enterprise of individual and associated merchants; their outlay would be repaid in a commodity, more generally sought after than almost any known article of trade. Specie is a mode of payment, which is not likely to be afforded by the Arab for the—to them at present—luxuries of England, yet for these they will readily grant in exchange a profitable and universally marketable article, which can always under the protection of steamers, be rapidly and at little expense conveyed down the river.

similar periods in both places. The unusual healthiness of the Euphrates crew at this season* must have arisen from their being in a much better climate than that of the Persian Gulf, a climate much drier in its nature and much more equable.

II.—*Some notices of the Seychelles, the Almirantes, and other Islands and groups of Islands, situated between the Equator and* 12° *South latitude; and between* 45° *and* 75° *East longitude, &c. &c.* By Major William Stirling, 17th Regiment, Bombay N. I.

My shipwreck on *Astova* and subsequent visit to the *Seychelles*, gave me an opportunity of examining those islands, and at the same time threw me among seafaring and other intelligent persons frequenting the islands, situated within the limits I have above stated. I have availed myself of the opportunity, thus afforded, to collect the information which I now offer to your Society. It is scanty, but I believe new, and as such, I conceive, worth your acceptance; though, as I have not been able to consult any work on the subject, it is given as I obtained it, with all its originality and imperfections.

Captain Owen's new chart is considered by many men navigating these seas quite correct, and therefore, I refer to it for the true position of the places mentioned.

In my description I begin with the Seychelles as the most important; Mahé being the residence of the Government agent, who is subordinate to the Governor of the Mauritius.

The Seychelles consist of thirty two islands of various sizes, from Mahè the largest, which is about eighteen miles long, by from one to five broad, down to some which are little better than naked rocks. They occupy what is called *Mahé Bank*, or *Seychelles Archipelago*, on the chart, and are all composed of granite of several varieties; their bases being more or less connected and surrounded by coral reefs.

These islands were first discovered by the Portuguese, who called them the *Seven Brothers*, from a group of seven island near Mahé; but they were first settled by the French, about seventy years ago, when Mahé-De-la-Bourdonnais was Governor of the Mauritius. He gave them collectively the name of Seychelles in compliment to the then Minister of Marine in France. The island of Mahé was called after himself.

The names of the other principal islands are Praslin, Silhouette,

* Only one case of fever among forty Europeans occurred.

and La-Digue. They are all mountains, well watered with streams, richly wooded, and inhabited. The summit of Mahé is about two thousand five hundred feet high. The scenery is beautiful; but Mahé, the only town or village in the group of islands, is a poor looking place. The houses, built of wood, and covered with shingles, bear a very unprepossessing, weather worn appearance.

The inhabitants are of French origin, descended chiefly from the settlers of that nation in the Mauritius and Bourbon. The whole population of the island is computed at about three thousand whites, and four thousand two hundred blacks; (some years ago the aggregate population amounted to nearly ten thousand). Yet there is not a church, or a chapel, or minister of religion of any description; nor any public school or place of education supported by Government, or where a black person can be taught to read or write. There are a few private schools for the white children. A marriage or divorce is the business of the magistrate; a burial is conducted by the friends or relations of the deceased. But to have the rite of baptism performed, they repair to the Mauritius, or await the accidental arrival of a priest on the island.

There used to be a subaltern's party from the Mauritius stationed on these islands, to check the irregularities of the seamen of the whalers, but they were withdrawn about six months ago. The only armed force now at Mahè consists of nineteen Gens d'Armes.

The coin in circulation on these islands is Spanish dollars; but English and Indian money are also current. The sovereign passes at five dollars; and a Bombay and sicca rupee pass together for a dollar.

The public functionaries consist of a Government agent; a sub-agent, who is also special magistrate for the protection of apprentices (late slaves); a Justice of the peace; and a Superintendent of police.

The sperm whale is found about the Seychelles, but the numerous whalers (English and American) which frequent these seas are precluded from resorting to Mahé (a most convenient place of refreshment,) by heavy anchorage dues, and driven to spend their money, and ruin their health at Madagascar, and on the coast of Africa.

Mahé itself sends out three small whalers, but they are all manned with Englishmen; the stout heart and nervous arm of that nation, being confessedly necessary to ensure success in such a dangerous, but spirit-stirring employment.

The Isle of France hurricanes do not extend to Seychelles, their limit being 10° south, and, Bourbon having no secure harbour, the English and French men of war sometimes spend the hurricane months at these Islands.

The Seychelles produce pigs and poultry of every description in great abundance. Fish also of indifferent quality; wild pigeons, doves, and willow birds; tree and rock oysters; maize or Indian corn; very fine cotton and rice; coffee, sugarcane, chocolate, tortoise and turtle-shell; shells and corals; bread fruit, raspberries, maniœ, mangoes, bananas, limes, oranges, guavas, melons, pumpkins, tamarinds, pine-apples, cabbages, carrots, turnips, sweet potatoes, sallads, palmiste,* cocoanuts, budams, yams, tobacco, a few cloves, grapes, cinnamon, kyapunna, (a kind of tea); abundance of fine timber for furniture, ship building, and all domestic purposes. The "cocotier de mer" grows indigenously on three small islands of this archipelago, and in no other part of the world.† The most rare and beautiful shells are found at Mahé. The "pot-a-case" a singular plant, and the leaf insect are also found there. The "cocos de mer," cut longitudinally furnishes the trenchers used in kitchens, and by the slaves.

The chief amusements of the inhabitants consist in smoking, visiting, dancing and playing at Dominos. Free masonry is in high repute among them, though they have no lodge. They are not great readers, but some of them have the works of the best French authors; and I was gratified to find in their libraries French translations of the Vicar of Wakefield, the Children of the Abbey, Young's Night Thoughts, and of several English books of travels and natural history; all very much admired.

The climate of the Seychelles is mild, and considered very healthy; measles, small pox, cholera morbus, and most other diseases are unknown. But the inhabitants are sad sufferers from the erysipylas, as they call it, or Elephant leg. At *Curieuse* near *Praslin*, there is an establishment formed at the recommendation of Mr. Harrison for lepers, who are sent there from the Mauritius and all its dependencies, and are well taken care of by a medical officer.

From the Equator to 12° south, the south east monsoon prevails from May till November; and the N. W., N. N. W. and variables from November, inclusive, till May, which is the rainy season. The weather is very sultry, and the rains fall with the greatest violence in December and January. From May till October, the climate is said

* To obtain one dish of palmiste six or eight trees are cut down. It is the heart of the new shoot at the top of the thorny palm that is eaten. On its being cut the tree dies.

† Synonyms, Lodoicea Sechellarum; Lodoicea Maldivica; Cocos Maldivica; Palmier de L. Isle Praslin, &c.

The above generally grow double, but they are frequently quadruple, and even quintuple.

to be delightful. This is the period when the fishing and cultivating parties leave Mahé for all the islands of the group, some of which are public, while others are private property; the right of possession and of fishing, having been conceded to individuals by the Mauritius government, on certain conditions.

Hawk-billed turtles, from which they obtain the tortoise shell, but whose flesh is poisonous; the green turtle whose flesh is so luxurious a treat, and from which oil and turtle shell are procured, and the edible land tortoises, are the chief objects of the fishers; while the rearing of pigs and poultry, growing maize, sweet potatoes and other vegetables, together with the manufacture of cocoanut oil, are the objects of the cultivators.

For each island there is a superintendent, generally a French creole, with from twenty to one hundred men of color. The musquetoes are so abundant and venomous on some of these islands, that each man is provided with a sack, made of Madagascar cloth to sleep in. Strange to say, there are very few of these insects at Mahé.

The months most favorable for procuring the hawk-billed turtle, are from July to December, while from December to March are the best for obtaining green turtle; though the latter are to be found plentifully all the year round. The tortoise shell of these islands is very highly esteemed.

The green turtle seldom comes ashore to lay during the day, and the hawk-billed never during the night. They both lay many hundreds of eggs in holes, which they dig in the sand, then cover them over, and leave them to time to hatch. The hawk-billed turtle weighs about 100 or 150 lbs. while the green weighs from 200 to 300 lbs. The former yields from two to six pounds of tortoise shell, worth from six to ten dollars per pound. In some countries, where the creature is taken alive, the fishermen bury it in the mud or sand as far as the edge of the shell, and by kindling a fire on its back, or by pouring boiling water on it, the shell becomes detached. The turtle is then liberated, and as is affirmed, becomes furnished with a new shell. In the Seychelles, however, this practice does not prevail.

The turtle are secured in two ways: first, by "turning them" when they come ashore to lay; and secondly, by striking them from a canoe, when in the sea, with an iron peg fastened to the end of a stick secured by a line and thrown like a harpoon, but from a greater distance. The Seychelles people called the hawk-billed turtle "caret" and the green turtle "tortue." Boats are constantly on the look out about the islands for "caret." The patience and perseverance of the fishermen, in waiting for an opportunity to strike (some-

times several days) when they have caught a glimpse of the fish, are said to be very remarkable.

The flesh of a green turtle is worth at Mahé, from three to four dollars. It also yields a thin shell, which has of late been brought into use in Europe for veneering, and melting into an imitation of tortoise shell. Oil is made from the fat; and the eggs are sent to Mahé or the Mauritius.

The Seychelles have little trade, being much fettered by the regulations of the Mauritius. They formerly exported cotton, coffee, coir-rope and oil, but since the slave trade has been modified, they have not had hands to produce more than enough to supply their own wants. They are beautiful and fertile islands, and might be made to produce any thing. They derive nearly all their imports from the Mauritius, which they look upon as a place of immense importance, and the focus of every thing luxurious and elegant. On these islands grows such good timber for ship building, that vessels of the size of five hundred tons are constructed of it. The ornamental wood for furniture is the *Bois de nalte*, a reddish wood, very close grained, and marked something like fine heart of oak. It is highly esteemed at the Mauritius, but it is now very scarce. The most curiously marked is said to grow on rocky places, where, from the difficulty and slowness of its growth, it becomes contorted and stunted.

Next in importance to the Seychelles, are the Amirantes, an extensive group composed of twelve or fifteen low coral islands, and many banks and reefs. The principal islands, Marie Louise, Isle des Roches, Isle Poivre, Isle De Ros, Isle Remire, and Alphonse, are permanently occupied. The *African islands* are mere banks.

The Amirantes all belong to the inhabitants of the Seychelles. Isle des Roches is the largest island, but Alphonse is the most fertile. The soil of the latter is deep and black, and produces a great variety of vegetables, fruits, and timber trees, large enough to hollow into canoes. It belongs to Mr. Huteau of Mahé.

There is nothing like a town or village on the Amirantes. The smaller islands are only visited during the fishing season, for "caret," turtle, and shells, of which the finest are found upon Marie Louise, but a tremendous surf makes it difficult of access. The Harriett, an English whaler, was wrecked on the then unknown reef *Fer-à-Cheval* near Isle Poivre, about two years ago.

These islands produce some cotton, abundance of Indian corn, pigs, poultry, sweet potatoes, turtle of both kinds, firewood, and a few cocoanut trees, which do not thrive well on all the islands. There are also a great number of doves, and wild pigeons, tropic birds,

boobies, man of war hawks, and other sea birds. On St. Etoile there are said to be sea crows.

Diego Garcia or Chagos Archipelago, is an immediate dependence of the Mauritius. These islands are all flat coral, covered with cocoanut and other trees; and the reefs which surround and connect them are remarkable for their abruptness, the sea being nearly unfathomable close to them. There are four families permanently settled on Diego Garcia, and a few on Salomon Islands and Six Isles. They breed pigs and poultry; also asses, to work in their oil-mills, cocoanut oil being their staple production, in the manufacture of which, lepers were formerly employed under an idea that it was a cure for their disease. These islands produce fine shells, and the *tato-maka*, a lofty and spreading tree, of white timber, valuable in ship building.

Coetivy belongs to gentlemen at the Mauritius, and produces abundance of cocoanuts, from which a great quantity of oil is made. It also produces Indian corn, fruits, &c. There is a small slimy pond in the middle of this island of unknown depth, in which every thing thrown immediately disappears.

Galegas also belongs to a gentleman at the Mauritius. It consists of two small, low, coral islands, between which there is communication at low water. They abound in cocoanuts, pigs, fowls, Indian corn, limes, bananas, and vegetables.

Juan-de-Nova, is a group of low coral islands and reefs, belonging to a gentleman at the Mauritius. He employs people occasionally on the largest island in catching turtle and fishing. There is fresh water, and a few cocoanut trees on it. There is also said to be a breed of wild dogs, which are very expert at catching turtle and fish. Juan-de-Nova has good anchorage to the northward.

In *Providence Island* and reef, consists one of the greatest dangers in these seas. The reef runs twenty miles out from the land. The following ships have been wrecked on it,—L'Heureuse, French frigate in 1769; Duke of Kent, about 1832-3; Pysche, in 1835; the Oure in 1836 ; besides a vessel bound from the Mauritius to Seychelles, whose name I have forgotten.

This island produces cocoanuts, Indian corn, sweet potatoes, and plenty of fresh water, and its shores abound in turtle and fish. Providence Island and its reef are low coral. St. Pierre is a very small, low, and flat island, not occupied.

The *Cosmoledos* is a group of seven or eight flat coral islands, abounding in turtle of both kinds, and in fish. There is good anchorage but no fresh water, and of course they are not inhabited.

Assumption is also a flat coral island with a small hill in the middle. It has no fresh water ; but turtle of both kinds abound.

Glorioso, consists of two coral islands and a rock; upon one of them there is fresh water, and the shores abound in turtle of both kinds, and beautiful shells. Mr. Michaud of Mahé has the grant of Glorioso. The *boobies* of this island have blue bills and legs, with red chests.

Aldabra the westernmost group, within the limits I have prescribed myself, consists of several islands, the largest of which is nearly twenty miles long, and of a singular coral formation, being surrounded by a barrier wall, six or eight feet high, of sharp, firm, and nearly impassable coral, outside which lies a sandy beach. This wall of coral throws out shoots in some places across the island, dividing it into compartments; while round the inside of the wall, grows a narrow belt of thick wood. There are occasional deep fissures in this coral bank, through which at high tides, fresh water spouts to considerable height. The island abounds in land tortoises, and turtle of both kinds.

Mr. Huteau of Mahé has the grant of it, but it is not permanently occupied. There is good anchorage at Aldabra. The tide at full and change, rises nine feet, and the current runs N. W. four and five miles an hour. There are no cocoanut, but plenty of wild fig trees on the island.

Astova is an island ten or twelve miles in circumference, with a lagoon (only two or three feet deep) in the middle, which reduces it to a mere shell. The land in general is very low, and thickly covered with brushwood and small trees, but there are occasional sand-hills from fifty to one hundred feet high. The current runs rapidly past it, to the N. W. and the tide rises at full and change about eight feet. It is a most dangerous island to approach: the Portuguese ship Le Don Royal, laden with slaves; two French ships, which went to save them, and the English ship Tiger, whose crew was not relieved for sixty-eight days, have been wrecked on it at different times.

Astova lies south of the Cosmoledos, and a ship in mid channel can see both islands at the same time. The soil of Astova is sand, based on coral rock, singularly elevated above the level of high water mark, from three to twenty-five feet, presenting in most places a rugged and forbidding aspect from the sea. It is said the slaves belonging to the Don Royal, lived on Astova thirty or forty years, and that their children upon the island were a remarkably fine race. The survivors have been removed to Mahé.

We found no bones nor other human remains on the island. There

is a fine bay or sandy beach on the N. W. side, the water of which is shallow to the edge of the reef, when it suddenly deepens to thirty-five, fifty, one hundred fathoms; and, at two cable's length, there are no soundings. Fresh water was first discovered on Astova by the crew of the Tiger, at the depth of eight feet from the surface of the ground. Green turtle, mullet, and other fine fish, land and sea crabs, and beautiful shells, madrepores, and corals, abound on its coast.

Astova is uninhabited. Its true latitude, from several observations, is 10° 3′ or 10° 6′ south. The officers of the Tiger had not the means of fixing the longitude, but the Emma, whaler, which kept her reckoning, and took her observations with great accuracy, corroborates Captain Owen's chart in making it about 47° 31′ east. The weather during the period we were on the island, (August and September) was rainy and boisterous.

The birds of the island are crows, with white necks and breasts, wild ducks or teal, humming birds of beautiful plumage, in great abundance; a small bird, sweet noted like a linnet; the tropic bird, (with one red feather in the tail, and which lays but one *dirty* red egg in the sand under the bushes;) man of war hawk, boobies, white gulls, plover, rail, water wagtail, sand piper, dove, curlew, and a large bird like the heron; we reckoned ten or twelve flowering plants, some of them highly aromatic. The trees are not large, but the timber of some of them is very hard and beautifully veined; from the bark of one species, I prepared excellent red ink. We found, had our detention upon the island required substitutes, stout creepers growing, that would have assisted us in making fishing nets; rats, (the only quadruped, but they are numerous) whose skins when dried and sewed together, might have furnished our bodies with covering; and a kind of wild hemp from which we could have made thread and strings. Salt we procured by boiling down the sea water, and we were enabled to keep our turtle fresh for two or three days. The insects and reptiles of the island are small centipedes, ants of different kinds, spiders, moths, butterflies, grasshoppers, crickets, musquetoes, bees of different kinds, lizards, dragon flies, hornets, and sand flies.

I have brought away numerous specimens of seeds, wood, corals, shells, coral insects, and of almost every substance found on the island, and on its shores. I also surveyed, and constructed a map of it; collected and dried specimens of all the flowers, and wrote botanical descriptions of them, but which I have not had leisure yet to unpack and arrange. The specimens of the large foreign drift timber, and of the seeds and volcanic fragments from the shores of Astova,

will enable any person who can determine the native places of such specimens to throw much light on the currents of that part of the ocean, which are at present but little understood, and very dangerous from their great rapidity.

Gama Island, (doubtful on the charts) was believed to be seen from the "La Prevoyante" Maria Joseph de St. Anné, at 3 P. M. steering east four knots an hour ; lat. at noon 2° 32′ south, longitude 75° 35 east : on the following morning several boobies were seen flying from the direction of the supposed island, which was considered a strong proof that land had really been seen ; as those birds are always observed to fly from the land in the morning, and to it at night.

I will now conclude with some observations on the formation of coral islands.

The coral rocks whilst under formation, are worked upon in ridges, like an ill ploughed field, very rugged and uneven. They are covered with very short, red, green, and other colored mosses, which I conceive to be not only the food of the insect, but from its softness and closeness, a protection to it in its operations, against the force of the tide and other injuries, that without such defence it would be exposed to.

On breaking the coral, it is in some instances soft as chalk, but in others nearly as hard as flint, and the insects are equally numerous in either. The irregularities and hollows in the rock, contain molluscæ and other marine animals of various, and mostly very ugly, appearance. The interior of the coral contains immense numbers of shells of different kinds, living and dead. On breaking up a piece of coral, fish, sometimes alive, are found in its intestines, and should a fragment be detached from the mass by the waves, if not washed out of their reach, it is seized upon and quickly cemented to it again by these active and industrious labourers, and with such success, that the surface of the reefs in some places (particularly at Astova) have the appearance of an artificial terrace.

It has been asserted that the lagoon is a general feature of coral islands. Certainly many coral islands have the lagoon, but that is merely to me a proof that the coral insect works in ridges and other fantastic forms ; for example, if the island of Aldabra was not so highly elevated above the sea, the waters would have forced their way through the barrier wall, which I have described on that island, which would then have soon become a bank surrounding a lagoon, exactly as at Astova. Moreover the fact is, that there are more coral islands *without* than *with* a lagoon.

A coral island may be supposed to be formed as follows, for it

must be observed that the coral insect never works above the water: The reef formed by them having reached the surface of the sea, trees, timber, sea weed, leaves, mosses, lichens, sponges, sand, mud, stones, and particles from other islands settle on it, and become cemented together by their own weight, and by the coral worms, molluscæ, and other gelatinous particles, contained in various forms in the sea. Then sea birds, turtle, and other amphibia, with the various crustaceæ and other inhabitants of the deep, "which own not man's dominion," frequent or inhabit its shores, and by their debris accumulating, stability is given to the whole, and an island fit for the resting place of man is brought into existence. But before it be ready for his permanent residence, seeds of plants, of trees, and shrubs will be carried there by birds, or by the waves, some of which will take root and flourish; insects will live on their leaves and branches; birds will flock to them, and find shelter and food; quadrupeds may find their way there; the coral worm will continue its labours, extending the limits of the island. Storms, and the ordinary course of the currents and the tides, will throw materials upon its shores, to *elevate the surface* and vary its outline; animal and vegetable matter will mix with the soil, and the rains and dews of heaven will water and fertilize it, rendering it fit to produce herbage, and shelter for man and beast.

On Astova, we found the indisputable marks of those slow, but sure operations of nature; and that island seems now to have arrived at a state ready to yield to man his bread by the sweat of his brow, and capable of producing every plant that is pleasant to the sight, and good for food. It is situated in a healthy climate, with plenty of fuel, fresh water, fish, turtle, and some good edible birds. Our dogs, pigs, poultry and sheep, throve well under the most unfavorable circumstances; and almost all the garden seeds, we sowed experimentally, came up well, although it was evidently not the proper season for sowing them.

The coast of this island (and indeed of all the islands) is strewed with foreign plants and timber trees, of many kinds and sizes, from the broken reed to the gigantic teak and cedar, and with remnants of wrecks of different periods, countries, and materials, from the canoe to that of the largest ship. A four pounder cannon, and two anchors of rather ancient manufacture lie near the north reef. I also found gums, lava, one small piece of basalt, pumice stone, and seeds of several kinds of trees and plants on the beach.

III. — *Report from Acting Commander Nott of the Indian Navy, on the Traffic in Slaves, &c. carried on at Massowah.*

(Presented by Government.)

Massowah.— Population between three and four thousand. It is considered far superior as a port, and also in a commercial point of view, to any place on the western side of the Red Sea. Merchants from the interior of Abyssinia come and reside here during the Hadj, with their agents, whose guests they are for the time. The agent considers himself responsible for any insult or offence offered to the merchant during his stay with him.

The articles of export brought here from the interior of Abyssinia for other ports in the Red Sea, are slaves, musk, hides, elephants teeth, gumarabic, very excellent ghee, and bees wax.

On the 16th February, there were in the town of Massowah one thousand slaves ready for shipment in small vessels of twenty-five tons, for Juddah. The nations of these slaves are, 1st. Gallas, who are faithful, clever, and capable of attaining any art or science, but prone to suicide. 2d. Abyssinians, for the most part christians, generally entrapped into slavery by the mussulmans who inhabit the borders of Abyssinia, between the mountains and the sea. 3rd. from Seedamah a christian country in an unknown part of Africa. 4th. Shengalah slaves, are negroes living on the northern frontier of Abyssinia. These last are never transported beyond the precincts of the island Massowah. It is to be remarked, that there are still some Abyssinian and Galla slaves, who are born moslems, but who are nevertheless kept in slavery.

It is stated that the Habab, Halli, and Shahoo people, (all moslems) gain a livelihood by kidnapping and making slaves of Abyssinian christians, and although it is acknowledged that none are slaves but those who have been bought, or taken in war, yet the principal merchants have often appealed in vain, to the Turkish Governor at Massowah, to liberate kidnapped christians.

It is affirmed, that 25 per cent is lost on slaves from Massowah to Juddah by sickness.

The nayb of Arkeeko (a town on the S. W. Massowah Bay) levies a tax of one dollar per head, on slaves brought from the interior. The king of Abyssinia, two dollars upon every three slaves; Oubeeah, the hereditary prince of the province of Seemaner, residing

at Adoa, one dollar a head. The slaves are sold by auction, and the auctioneer gets one dollar per head.

Last year according to the account of an Abyssinian merchant, there were sold at Massowah one thousand five hundred and three christian slaves.

A Galla slave, aged about 25, is worth from thirty to forty dollars, at Massowah; a good female slave for the Harem, sold not long since for one hundred and fifteen dollars. The Abyssinians purchase and keep, but never sell their slaves.

Habab, means that part of the country extending coastwise from Ackeek island (a short distance south of Suakin) to the bottom of Annesley bay; and inland, it is said to extend to the first range of Abyssinian mountains. The people inhabiting this part are in language, faith, manners, and customs, completely distinct from the Abyssinians; their faith is now the moslem, to which they are said to have been converted about one hundred years ago.

The musk comes from Nareeah, a country to the S. W. of Gondar. From one thousand two hundred, to one thousand five hundred horns of it are said to be brought to Massowah annually. The Nayb of Arkeeko levies one dollar upon every horn. The Governor of Massowah takes one tenth of all the musk brought here, and disposes of it at his pleasure, generally sending it to Juddah. A large horn is sold for one hundred dollars, and contains from six to seven local pounds; the small horns contain from two to four pounds; (a local pound is equal to one English pound). A first rate caravan the other day brought twenty-five horns. Of late, the merchants have so adulterated this commodity, that the price of a horn has fallen from five hundred to one hundred dollars.

A caravan has sometimes brought four hundred teeth. The Nayb of Arkeeko exacts one dollar upon every tooth weighing 40 lbs.; this is almost equal to five per cent. of the value. At Massowah the ivory is sold in the presence of the Governor, who takes five per cent. At Adoa a tooth pays two dollars. At Halli on the frontier, quarter of a dollar, and again by the Hassaorta tribe, half a dollar; this duty varies according to the size of a tooth. No gold dust is brought from Abyssinia to Massowah at present. Of ghee, thirty thousand pounds are exported annually from Massowah: ten pounds are generally worth two dollars. The freight on one hundred pounds is, to Juddah, three quarters of a dollar, and to Hodeida or Mocha, half a dollar.

The gum and ghee come from the Habab tribes, and the provinces of Hammassane and Kayackor, which people though speaking

the Abyssinian language, reside on the eastern side of the Abyssinian mountains.

Moosa Maffairah, the principal banker and merchant at Massowah, takes in fifteen thousand dollars worth of gum every year, more than one half of what is produced. One dollar for every ten pounds of gum, or ten per cent. of the value, is paid as duty. The gum is generally quite white.

The Nayb of Arkeeko exacts no duty on hides. At Massowah within the last two years, the duty on this article has been increased. On an average, four collars of glass beads, or a little more than one eighth of a dollar, is levied upon each hide.

In general the duty upon every thing at Massowah is one tenth. There is no duty upon articles of apparel.

For maintaining the navy and light-house, one hundred dollars are allowed per month; for artillery and stores, two hundred and fifty dollars ; pay for the arnouts or irregular troops, fifty dollars ; The Governor's personal pay is one hundred dollars per month ; his secretary's, forty dollars ; and for the supply of wood and water, which is brought from Arkeeko for all the government agents, ninety dollars. The Governor pays to the Nayb of Arkeeko one thousand dollars per month. Total expenses of Massowah per annum, nineteen thousand, five hundred and sixty dollars.

The Nayb of Arkeeko pays the Governor of Massowah annually between one thousand six hundred, and one thousand seven hundred dollars.

Corn is brought to Massowah for the "Habab," from Yemen. They grow but a small quantity, and only in the vicinity of Massowah ; the corn here spoken of is dhoura. Indian rice is imported not only at Massowah, but at Arkeeko.

When the dues collected at Massowah are not sufficient to defray its expenses, the Governor borrows from Moosa Maffairah, the principal banker before mentioned.

Dhalac island two years ago, yielded one thousand two hundred dollars, but from the decrease of pearls, it is said at present to yield per annum, only seven hundred dollars.

State of Abyssinia. In the province of Tigré near the sea, there are two chiefs, one named Kassai and the other Oubeeah. The latter, the hereditary prince of the province of Samen, is consequently a subject of the Governor of Gondar. Oubeeah overran the part of Tigré and possesses now Adoa, and Axum ; Kassai possesses the mountains to the S. W. of Arkeeko ; these are sterile, but he possesses also the salt plains which supply salt to all Abyssinia ; a

commodity used as money : a dollar in Gondar is worth thirty-five pieces of salt.

Kassai is generally preferred by the people to Oubeeah, and he has lately, by the assistance of English muskets, obtained a great victory over Oubeeah, and forced him to sue for peace, which has been concluded.

There are said to be still two thousand Engiish muskets remaining at Arkeeko.

Gondar obeys Ras Alli, and his mother, who is reported as being very clever in government affairs.

To the north of Gondar are the provinces of Denbayah and Gomoduyah, they are commanded by a general of Ras Alli's named Coomfao. This is the individual who, in the month of April last, obtained a signal victory over the Pacha of Egypt's troops, (commanded by Koorshid Bey) at Muttammah,a town taken by the Pacha from the Abyssinians. The occasion of the war is said to be as follows. Koorshid Bey made an inroad into Abyssinia, and captured one thousand three hundred christians whom he despatched to Sennaar.

The war is not yet at an end. It is reported that the Pacha of Egypt has sent a great reinforcement of troops to Gondar, which is eight days journey for an army. Koorshid Bey, is said to have written to the Governor of Gondar to say, that he would shortly be in his town and profane all his churches.

Koorshid Bey is now (4th March 1838) absent on leave at Cairo.

The above was related to me by an Abyssinian merchant, about to return into the interior, and interpreted into English by Mr. D' Abbadie, a gentleman apparently very much interested in, and about to explore every part of, Abyssinia.

IV.—*Note on the Island of Karrack in the Gulf of Persia.* By James W. Winchester, A. M.

Karrack, or Kargh, is a small rocky island, twelve miles square, distant thirty miles from Bushire, in a North-west direction, whose local position is very favorable to commerce, as it commands the navigation of the Bussorah river, and has an easy communication of a few hours sail with the Persian and Arab shores.

Towards the end of the eighteenth century, it was occupied by the Dutch, under Baron Kniphausen, who obtained a right to the island from the Shaik of Bundereeg, and fortified it. During his government, in the short space of eleven years, the population rose from

one hundred poor pilots and fishermen to eleven thousand: but no sooner were the Dutch driven from the place than its importance rapidly diminished, and now the fort of Kargh does not contain five hundred inhabitants, whose chief occupation is to pilot vessels up the Shat-el-Arab to Bussorah.

The island runs north and south. Its southern extremity is rocky, and elevated nearly three hundred feet above the level of the sea, while its other extremity is low and sandy, having the fort of Kargh on its north-east point. The rocky portion rises abruptly from the sea, and its summit is a table land, which has on the greater part of its surface a thin loamy soil, cultivated in the rainy season. The sides of the ridges presented to the sea are broken in upon by several deep and broad fissures, extending in upon the table land upwards of three or four hundred yards, in whose hollows masses of stone are deposited, as if they had fallen there on the formation of the rents.

The rock is composed of coralline sandstone, and limestone; also plentifully mixed with fossil tubipora, with an appearance of horizontal stratification, but most commonly present only in huge tabular masses superimposed on a loose sandy basis abounding with disintegrated particles of limestone and mica, occasionally assuming a stratified formation, with the strata of different colors. Limestone with an earthy appearance resembling chalk, and detached pieces of gypsum, now and then occur, but no other geognostic formations are found.

In the limestone numerous oyster, cockle, lamprey, and a variety of other smaller shells are obtained— fossils coeval with the island's formation, which is Neptunian, and has by some convulsion of nature been raised from the bottom of the sea, at a period later than the primary formation of the continent.

Near a large tomb in the centre of the island, and facing the north on the side of the rocky hill, are two caves cut out in the solid stone. The largest excavation is about fifteen feet square, and eight feet high, once divided by pillars and arches into regular compartments, but now defaced by time. The other cave has a similar appearance, there being neither figure nor carving in either remaining, whereby the age when they were first formed might be guessed at. Besides these two caves, there are a number of smaller holes cut out in the rock, and in their immediate vicinity is an inscription roughly cut resembling the Pelvic character, which, with their general appearance gives them the stamp of antiquity. Ives supposed they were the habitations of the first settlers on the island: but it is very probable they may have been used for religious ceremonies by the priests of the Guebres, or fire worshippers.

The table-land is occasionally broken by ravines, and towards its northern boundary it becomes irregular and sloping, smaller mounds leading gradually down to the sandy plain. The soil formed by the disintegrated rock and the sand is tolerable, and might be cultivated if the slope was sufficiently extensive and regular. As it is, in many of the ravines are gardens, in which are fruit trees and vegetables, while in the clefts of the rock, vines are planted, enclosed by circular stone walls, which cause many portions of the rock to look as if covered with ruins.

The low part of the island possesses a sandy soil, mixed with particles of disintegrated rock, and capable when irrigated of producing crops; about one hundred acres are thus employed by the inhabitants, and during the cold season upwards of five hundred are cultivated, when the rains fall: the soil though mengre, is capable of great improvement. The beach is of small breadth, and rises somewhat abruptly from the sea, whose bottom is covered with coral rocks. Its sand is firm and intermixed with calcareous particles, by constant attrition formed into a variety of shapes, and dead shells, without pebbles either calcareous or quartzy.

The inhabitants are degenerated Arabs, who live within the walls of the fort, which inclose a much larger space than is now required, even though many gardens are attached to the houses. Their occupation, besides piloting vessels up the river Euphrates, is fishing. They proceed to the banks of the Shat-el-Arab in the date season, and on their return cultivate the soil on Kargh, and the neighbouring Corgo, which is a low sandy island, about three miles long, and distant two miles from Kargh in a northerly direction, and uninhabited the greater part of the year.

The grains grown are maize, barley and wheat; brinjoles, radishes, beans, and gourds, are abundant, but fruits are scarce. A few grapes and water melons, can only be procured at times on the island, while every variety of fruit and vegetable, with other supplies are easily and cheaply obtained from Bushire and Bussorah. The botanical productions of Kargh are limited. I observed the date tree the banyan, Ficus Indica, the willow, the acacia arabica, the henna bush, the cotton plant, tamarisk, a species of salsola, jowasa, hedysarum alhagi, coloquintida, cucumis colocynthis, some of the common fruit trees of Persia, and occasionally on the rocks a few aromatic shrubs. The wood on the island is insufficient to afford a supply of fuel, which is brought in small boats from the neighbouring coasts.

Bullocks and sheep are fed on the island, but with the exception

of a few antelope, no quadruped exists in a state of nature. Partridges and quail are occasionally seen. Turtle have been caught on the beach, and fish is plentiful.

The supply of water is abundant and of excellent quality.* It is obtained either by digging wells, twenty feet below the surface, or from long subterranean aqueducts, which extend often from the centre, or from one side of the rocky part of the island to the other. These underground channels were found by the Dutch, and were believed by them to be very ancient : they extend inwards often a mile in the solid rock, and holes circular and square are cut down upon them, from ten to fifteen feet deep to admit fresh air and light in order to permit the inhabitants to pass up, and remove any accumulations likely to choke them, and to raise the water. Their mouths are generally in a low arched cavern formed by nature, and it is not until some distance inwards that they exhibit art as having been had recourse to for their formation. It is, therefore, most probable, that these springs, having been discovered issuing from the rock, by the first inhabitants of the island, were followed up to their sources to insure a constant supply of water. Their courses are generally in a straight direction, and their beds run on a soft calcareous soil, the basis on which the coralline rock of the island is superincumbent, and which has been originally removed, for the construction of these aqueducts, so that almost invariably the rock forms their roof, down which places for the admission of air and light are cut. The stream from these springs is small but constant, and generally terminates in a large pool, outside the cavern in a ravine, whose hollow exhibits an abundance of natural vegetation, or is converted into a garden by the natives.

The climate of the island has always been deemed very salubrious. Sir John Malcolm in his History of Persia, says, "the island of Karack is very healthy, has plenty of water, and in some parts a good soil." The atmosphere is less moist than that of Bushire, indeed, so much so, that the depression of the moist bulb during the late hot season ranged during the day from 6° to 17°, and at times to upwards of 20°, while the maximum temperature seldom exceeded in tents 94°, and with cuscus tatties could be kept sometimes as low as 76° though the average indicated heat by the thermometer was about 82°, when a northerly wind prevailed: but the south wind being moist, with it, the same results did not uniformly ensue. The continued healthiness of the troops marks the island's salubrity.

* 'The water found on all the islands in the Persian Gulf is good and sweet, while that on the coast of the mainland is uniformly brackish.' Horsburgh. Water, obtained from Bunder Abbas, I found to be an exception.

V.—*Journal of an Excursion to Sanaa the Capital of Yemen.* By Mr. C. J. Cruttenden, I. N.

(Presented by Government.)

Owing to the sudden and unexpected death of my companion, Dr. Hulton, the task of writing this narrative has devolved upon me. I have, however, made use of his notes, and, if any remarks on the geology of the country through which we passed, are found in this journal, they are entirely his. I have only to regret, that the task has not fallen into abler hands, and that so interesting a country has not a more competent person to describe it, than myself.

The observations were taken chiefly by Dr. Hulton, and our latitudes agree very closely with those of the celebrated traveller Niebuhr. The longitude of Sanaa corresponds nearly with his also. It may be as well to remark, that owing to four years of drought, the country had assumed in many places, a much more parched appearance than usual; and though the tract we passed through looked luxuriant, yet we were told that after the rainy season, it would become still more beautiful.

During the time that the Palinurus was employed surveying Mocha roads, Dr. Hulton and I obtained permission to visit Sanaa, the residence of a Prince who formerly was acknowledged to be the most powerful chieftain in southern Arabia, and whose father had shown much attention to all English officers, who happened to visit his country. With the exception of M. Niebuhr, who was at Sanaa in 1762, I am not aware that any traveller has published an account of his journey.

Of the accuracy of M. Niebuhr's account we have every proof, and though, from the length of time that intervened between his visit and our's (in 1836), many of the towns are altered for the better or worse, still in his details of the manners, customs, dress, &c., of the tribes inhabiting Yemen, his description may be relied upon in every respect.

Having provided ourselves with Arab dresses and six stout mules, we left Mocha on the 13th of July at sunset, intending to travel across the Tehama by night to Beit-el-Fakih.

We had intended to take the southern route, but owing to the quarrels of two powerful tribes, that road was impassable, and in fact it has been blocked up for the last eleven years.

Niebuhr has so well described the Tehama, that any mention I may

make of it is almost superfluous. It is, as he describes, a long belt of sandy country, extending from a short distance below Juddah to Mocha. It however furnishes sufficient grain for the consumption of the numerous villages which are scattered over its surface, and receives the waters of several small mountain streams, which soon lose themselves in its sandy and arid soil. The inhabitants, generally speaking, are unfavorable specimens of the Arab; small in stature, and timid from not engaging often in war. The Bedouins or "Junglees" of the Tehama, are widely different from the bold mountain Arab, who, accustomed from his infancy to plunder, and frequently murder, looks down with scorn on the being who can dirty his hands in cultivating the ground, and bear the yoke of their Egyptian governors, without daring to resist their repeated acts of cruelty and oppression.

Our first stage from Mocha was to the small village of Rouez, about 14 miles, where we found quarters in a *serai*, or, as it is called here "Mekhaya." We were quickly provided with rude bedsteads, and slept in the open air. This is the universal custom in Tehama, and if the precaution is taken of covering the face with a light cloth no bad effects ensue from the exposure.

We were never questioned about our travelling inland, nor was the least notice taken of us. Our host presented us with our share of sour milk and jowaree bread, and made the same charges as he would to a camel driver, and saw us depart the following day without asking a question regarding our route.

We reached our next stage, Mooshej, on the following evening, and found the same accommodations as at Rouez. The country we had crossed was very uninteresting, being covered with coarse grass and stunted shrubs, as far as the eye could reach. We found Mooshej a tolerably large town, having two handsome mosques, and a population of perhaps eight hundred souls. One of the mosques is said to be the favourite resort of Imaum Ali, the son-in-law of Mohammed, who generally descends in an invisible form, but has been seen occasionally by a favored few.

The immediate vicinity of Mooshej, abounds in jasmine and a very beautiful flower called in Arabic "Kadeea," and in Hindostanee (as our servants told us) "Kaioura.*" Both kinds of flowers are daily sent to Mocha. The Kadeea yields a fragrant oil, and the flowers of the jasmine divested of their stalks and strung on thread, serve to adorn the heads of the females, by whom it is highly prized. At this place we were taken for Bussorah merchants, and the clerk of

* Pandanus odoratissimus.

the sheik demanded an inspection of our baggage, but an explanation immediately satisfied him, and we were left undisturbed.

The soil around Mooshej, though sandy and barren, is yet capable of producing tolerable crops of dokhun, (millet) jowaree, and two or three kinds of fruit. It is under the superintendence of sheik Hussein bin Sahya, a celebrated character, who, as an ally of Mohammed Ali Pacha, enjoys, unmolested, the town of Heis, and the country between that city and Mooshej.

Our next stage from Mooshej to Shurjah was long (twenty-eight miles,) and fatiguing. The country, if possible, assumed a still more uninteresting appearance, and we passed but one hut on the road. We found Shurjah, or as Niebuhr spells it, "Schердsje" a small village, nearly deserted, owing to the scarcity of water and fodder. The soil, however, about Shurjah, from its vicinity to the hills, is much richer, and between that village and Zebid, the country was cultivated for several miles without interruption. Want of water, however, had caused a failure of the crops, and the people were suffering great distress. For four years no rain had fallen, and this had raised the price of grain so high, that they could hardly find means of subsistence. The scenes of misery we had witnessed in Mocha, sufficiently attest this truth, and what with the famine, and the brutally oppressive conduct of the Egyptian troops, the inhabitants of the Tehama have reason to complain of their melancholy condition. The costume of the inhabitants here began to alter. The women wore large trowsers, drawn tight round the ancle, and both sexes wore conical straw hats, similar to those used by the slaves at the Cape of Good Hope. Our road from Shurjah to Zebid, was through a thick jungle of acacia and tamarisk trees. Numerous wild guinea fowl were seen, but we shot only one. They were hardly worth the trouble of bringing down, their flesh being so tough. We crossed two large water courses, which on our return we found impassable. Niebuhr mentions "the beautiful valley of Zebid," but we did not see any thing remarkable in it, owing perhaps to the want of rain for so great a length of time.

On approaching Zebid, the ground becomes stony, and water is scarce; there is only one small stream, which, however, never fails, and is I believe the only river in southern Tehama which reaches the sea throughout the year.

On our return from Sanaa, we found the town almost under water from the heavy rain which had fallen since our first arrival, and the road to Shurjah was impassable, in consequence of which, we were obliged to strike off at once to the coast at Kattaba. These sudden floods are not unfrequent, and the Arabs have a tradition that Zebid has

been three times washed away, and they point out an ancient mosque as the only building which has withstood the fury of the torrents.

We arrived here late at night, slept outside the walls, and entered the town on the following morning, where we found comfortable quarters and civil people. During the morning we were visited by two Turkish officers from the garrison. They were very inquisitive, and would not believe that we were travelling for pleasure; at last, one asked us plainly if we were not going to make a treaty with the Imaum, regarding the expulsion of the Egyptian army from Yemen. Of course we laughed at the idea, and they departed only half satisfied with the result of their visit.

From the circumstance of its walls and houses being of their natural dull brick-red color, Zebid wears a sombre appearance after the clean whitewashed buildings of Mocha. This idea is strengthened on entering the town, by observing the number of buildings in ruins. It has, however, a large and well planned bazár, which daily furnishes fruit and vegetables for the consumption of the inhabitants, and the Turkish garrison, consisting of four or five hundred men.

Two lofty, but plainly built minarets, point out the mosques of El Jamea and Wolleeúlhah, the tutelar saint. Another large mosque, Wollee Shair, is situated at the S. E. corner of the fort, under cover of which, an attacking force might march to the very walls in perfect safety. Zebid has four gates, viz. Báb Koortub, Báb Sahum or Shahem, Báb Subáruh and Báb el Mukhel. On our arrival, an Arab from Abou Arisch, was Dolah; but on our return we found him dismissed, and a Turkish officer of low rank (a Bimbasha) in his place.

The trade of Zebid is inconsiderable. A small quantity of coffee is forwarded to Mocha by the Banians who reside here, and carry on an uncertain trade by the exchange of Indian goods for the honey, coffee, gums, &c. which the Bedouins bring down from the interior of the country.

Leaving Zebid at our usual hour, 3 P. M. we passed the large village of *Tooraibuh*, and the ruins of the village *Muhat*. At the latter place we saw several handsome tombs mentioned by Niebuhr, but the place is now deserted, and the coffee-house keeper was the only inhabitant. For many miles the country was flat and uninteresting, but on approaching Beit-el-Fakih the scenery improved, and the labourers merely waited for rain to ensure them an ample return for their toil. At 2 A. M. we reached our quarters at Beit-el-Fakih, after a stage of twenty six miles, and established ourselves for the day in a comfortable Serai.

Beit-el-Fakih is a large straggling town without walls, having some well built stone houses, and a fortress in the centre, called Hussone Othman, garrisoned by about three hundred Egyptian troops. The governor is an Arab, by name Ahmahr ibn Mohammed Haiduh, under the surveillance of a Turkish effendi.

It has three mosques, viz. El Jamea, Khorejahn, and Elmas; besides several handsome tombs in the neighbourhood.

This is at present the frontier town belonging to the Turks, and forms the grand emporium for the coffee, which is sent to Hodeida. The Banians have found their way here, and established themselves as merchants, but complain that, owing to the rapacity of the Turks, they can barely gain a livelihood.

Beit-el-Fakih is larger than Zebid, and, from not being walled in, has a more airy and cheerful appearance. It is, however, the hottest place on the Tehama, the thermometer standing in the shade at 102°. Fah. We called upon the Effendi and were politely received. He took charge of our letters and gave us an introduction to the sheik of Senneef, a small village dependent upon Beit-el-Fakih, and our next halting place.

We were now about to leave the Tehama, and enter the mountains. As yet, during our six days journey from Mocha, we had met with no difficulty worth mentioning, and had never been insulted on the score of our religion, or tormented with questions regarding our intentions. In fact, I think that any Englishman may travel in safety through this country in his own costume, and suffer no more annoyance than we did.

At sunset we left Beit-el-Fakih, and striking across towards the hills, entered a thick jungle, said to be infested with robbers. We were enjoined to keep a sharp look out, and to have our arms in readiness. An hour, however, took us through this dreaded jungle in safety, and we entered a broad valley close to the foot of the hills: passing the village of Mahood Ali, we reached the foot of the mountains, and pushing our way up a narrow gorge densely wooded, we descended into the large and beautiful valley of Senneef. The scene was now changed: instead of the flat stony plain which we had found on the other side of the mountain, we were suddenly transported into a rich and fertile country, exhibiting extensive cultivation, and having many stately tamarind and tolak trees, growing along the banks of a small mountain stream. We arrived at our quarters at 2 A. M. and were civilly received by the Bedouin who officiated as host.

On the following day the sheik sent us a present of two sheep,

and called upon us soon after. I walked out to shoot some guinea fowl, and was accompanied by, at least, sixty men and boys who seemed to enjoy the sport much.

The scene strongly reminded me of India. Our party was increased by two Sanaa merchants, and the leader of a large kafla or caravan of camels, which was waiting a few miles further on. We were now to travel in the day time, the intricacy of the mountain passes not admitting of our journeying by night.

Passing along the banks of a water course, Wady Kholaba, we continued gradually ascending, by a narrow path, in many places so steep, that we were obliged to dismount. The scenery was very fine and the weather so cool, that we experienced no inconvenience from the sun. We found the country well cultivated, and passed several small villages built of stone. At 5 P. M. we reached Hajjeer, the frontier fortress of the Imaum's dominions, situated on the ridge of a lofty range of mountains. The coffee-house was built in the form of a castle, the interior having a square in the middle for the cattle, and surrounded by small cells, into one of which we crept, and, notwithstanding the fleas, slept very well

Hearing that the sheik of the Beni D'thubabee tribe was in the house, we called upon him, and he promised us his escort to our next stage, Somfoor, where he would make us over to another chief. We accordingly followed him to the foot of the hill, where we found a large kafla, and an escort of twenty-five men. About seven miles from Hajjeer, we passed a strong hill-fort, called Hussone Duggera, where ten or fifteen men joined our party, as by their report, the country in the immediate neighbourhood was not safe.

Crossing a very large valley, called Wady Seham, having a broad stream running through it, we reached Jibal Harráz, a lofty range of mountains abounding in coffee and many kinds of fruit. Near this a desolate looking plain was pointed out as "Kubt-ibn Deran." It was said to be infested with robbers of the Beni Korah tribe, who are connected with the Beni Lam, bordering on the Asyr country. About two years ago a poor man happening to cross this place, was accosted by one of the Beni Korah, who observed something in his bag which was shaped like a dollar. Without hesitation he drove his dagger into the poor wretch's back, and then found that it was only the bottom of a coffee cup which had tempted him to commit so foul a crime. He did not however escape, for the neighbouring tribes assembled, and put him to death on the same spot.

We reached our halting place, Somfoor, about 5 P. M. and the Sheik kindly gave up the best hut to us, and sent us a sheep for

dinner. We here found a large kafla of seventy or eighty camels waiting for escort to Hodeida. The sheik fixed his own price, and leaving us in charge of a small party of eight or ten men, he returned to Hajjeer. We halted the following day in the midst of the most magnificent scenery I had ever witnessed. The bottoms of the hills were thickly clothed with wood, above which a barren mass of white lime-stone rock reared its head. Our resting place was formed by a huge fragment of rock, which had fallen from the mountain, and formed a kind of natural cavern, large enough to contain twenty men.

Though great curiosity was shown, still no impertinence was offered, and they looked on with great gravity whilst we were dining. We were the more pleased at this, as, from the specimen we had seen of the Arabs on the coast in the neighbourhood of Aden, we had every reason to believe, we should be teazed to death by their importunities for presents, and by their insatiable curiosity.

We found here a small coffee plantation, which we went to visit on the following morning, and were pleased to find it of the best kind. The shrubs averaged seven feet in height, and the branches were thickly studded with fruit. The plant requires the soil around its roots to be moist, though apparently it does not want much rain. It is always found growing in the greatest luxuriance in the vicinity of a spring, and in plantations where water is scarce, it looks dry and withered. We were assured by the Arabs, that the plant is watered regularly morning and evening—and that it takes three years to arrive at maturity. We were told that a good bush of the *Oudanee* sort, standing about eleven feet high, ought to produce twenty-eight pounds of coffee yearly.

The coffee is transported in December and January to Sanaa, from the surrounding districts. It is divided into seven classes, as sherjee, the best; oudanee, the largest, &c., From Sanaa it is carried to Mocha and Hodeida, but since the Turks have taken possession of the Tehama, the merchants have been afraid to send large quantities, and consequently the coffee market in Sanaa is much overstocked. The merchants clear at present three and half dollars on every camel load; the total expense of transporting it to the sea coast amounting to forty-four dollars.

The coffee plant is found usually growing near the sides of any valley or other sheltered situation in soil which has been gradually washed down from the adjacent heights, produced by the decomposition of a species of claystone, which is found associated with trap-rock, amongst which, as we approached Sanaa, basalt is found

to predominate. The claystone is only found in the more elevated districts, but the detritus finds its way into the lower country by the numerous steep gorges which are conspicuous in all directions. As it is thrown up on one side of a valley, it is carefully protected by means of stone walls which present the appearance of terraces.

In these plantations, several fruit trees, as the plantain, almond, &c., are found; and occasionally small patches of Indigo. Leaving the coffee plantation at Dora, our road lay through a winding and difficult pass, in many places built up in flights of steps, which opened into the broad and beautiful valley of Seyhan, where we found barley, oats, Indian corn, and jowaree, growing in the greatest luxuriance, and watered by several small mountain streams and wells. We slept at a village called Mofakh, situated on the summit of a small conical hill, and almost impregnable by nature. Our quarters were at the foot of the hill in a stone building, called here a *Simsevah*, and answering to the Mekhaya or coffee house of the Tehama. It was divided into three compartments by arches, the centre forming a stable for our animals, and the wings elevated about four feet, serving as sleeping places for ourselves. *Mofakh* is one of the market towns, and it may be as well to remark here that in the Imaum's dominions, there are markets held every day during the week at particular villages. Hajjeer being the Sunday market; Senneef the Monday; and so on. By these means, goods from the sea-coast are rapidly conveyed through the country, and corresponding returns find their way to Mocha and Hodeida.

Fruit forms a principal article of food for the poorer classes, and during our stage from Dora to Mofakh, we frequently found people sitting by the road side with baskets of grapes and apricots, and a pair of scales. The night at Mofakh, was bitterly cold; the temperature of the water in a spring, close to the house was 62°. At this place we found another coffee plantation of the oudanee sort, but owing to the scarcity of water, the trees looked parched and languid.

Crossing over a very hilly country, rather more barren and stony than any we had before seen, we slept at the village of El Houthein, and passing through the small hamlet of Komiss, we reached the village of Muttnah in the afternoon of the second day, from *Mofakh*; here we despatched a messenger to Sanaa to request permission to enter the city, and to advise our agent of our coming. Our last stage had been most interesting. From the steepness of the mountain sides, no grain could grow on them. The inhabitants had therefore to cut away the ground, so as to form a series of terraces,

on which corn, barley, &c., flourished, and in the midst of which were scattered numerous small hamlets, looking clean and white, with their separate mosques and tombs. I counted upwards of one hundred and eighty of these platforms in regular succession, and the appearance of the valley, which formed a magnificent amphitheatre, was most striking. As we approached Sanaa, the country became more stony and barren, and the character of the hills altered; and here it may be as well to subjoin a few remarks on the nature of the ranges of mountains over which we had passed.

The hills about Senneef are not high, and seem to be composed chiefly of trap of various kinds. The same formation prevails as far as Somfoor, where the structure of the rock becomes more crystalline, and partakes of the character of granite. Here the hills assume a remarkably varied appearance, stupendous masses are heaped one on the top of another, to an enormous height, and others have rolled down of such dimensions as almost to obstruct the road through the valley. One of these forms the resting place at Dora. Near Mofakh this rock disappears and a mixed rock now prevails, containing a large proportion of hornblende, argillaceous matter, and quartz. From El Houthein the clay predominates, and from this bed it would seem that the chief part of the soil deposited in the valleys is washed down. After surmounting the lofty hills beyond Komiss, the country becomes less mountainous, and the rocks appear to be of a volcanic nature, large masses of cellular trap and scoriæ lying scattered upon the plain.

At the small village of Boán, we saw the first bridge that I had ever crossed in Arabia. It was perfectly well built of hewn stone, and though in any other part of the world a bridge would be no curiosity, I may venture to say that it is so in Arabia.

Muttnah was the most uncomfortable halting place we had visited. The night was too cold to admit of our sleeping in the open air, and vermin of all kinds, which swarmed within, equally precluded all possibility of sleeping in the house.

On the following morning we started early, and, passing over a barren tract of land of some miles in extent, suddenly came in view of the valley and city of Sanaa—fifteen hundred feet below us. Descending rapidly we soon reached the walls, and followed by a great crowd, entered the suburb of Bir el Asab, where we were met by our agent, who escorted us to a dwelling prepared for our reception, and assured us of the good feelings of the Imaum towards Englishmen in general.

Having refreshed ourselves with fruit and coffee, we wished to

go out, and stroll about the quarter in which we were residing, but to our chagrin, we found that to show ourselves outside, before we had had an audience of the Imaum, was contrary to the etiquette of the court of Sanaa, and the gates were locked upon us. Knowing that the same thing had happened to Niebuhr, we were much amused at first, but soon got tired of waiting, and endeavoured to elude the vigilance of our host. He however so forcibly pointed out the danger he incurred, that we gave up our point. On the following morning, the Vizier came to see us, and examined the presents which we had brought for his Highness. As soon as it was found that we really were English, and not dangerous, we were formally welcomed to the city of Sanaa in the Imaum's name, and directed to accompany the Vizier to a residence prepared for us in the Imaum's gardens. Shortly after our arrival at our new domicile, we were sent for by the Imaum, and passing through the gardens, found ourselves in a magnificent saloon, at the end of which sat Ali Munsoor, the reigning prince, with his uncle Seedee Mohammed, or the "Saif el Khalifa" standing on his right hand. After shaking hands, we were accommodated with chairs, and after a few trivial questions, the presents were produced and graciously accepted. The Doctor felt his Highness'pulse, and promised medicine. We were then told that we might "retire, and live in safety in our house, as we were Englishmen and his brothers." Ali Munsoor is a young man, perhaps twenty-four years of age. From his mother, who was an Abyssinian, he has a very dark complexion, and a cast in his eye gives his countenance a forbidding expression. He was dressed in a crimson silk robe with a white turban, wound round a flat gold cloth cap, and a dagger studded with jewels. His uncle, Saif el Khalifa, or sword of the Khaliph, wore a most superb dress of flowered silk, and a white camoleen crossed with bands of gold thread.

On our return we were besieged for "Bucksheesh" by eunuchs, grooms, servants of all descriptions, and about twenty old women. We were much surprised at seeing these ladies in our house, but on inquiry we found that they were the cast off women of former Imaums, and were allowed to pass the rest of their days in the pay of the Imaum. Without their interest we were told, no person could obtain an audience of his Highness, and this we found is really the case, for whenever we wished to see the Imaum, we had first to secure the good wishes of these old ladies, by tendering a dollar or so, which was always graciously received.

Drunkenness seems to be the prevailing vice amongst the higher classes in Sanaa. Twice we were at the private apartment of the

Imaum, and each time we left perfectly disgusted. The Imaum with five or six dancing and singing girls, got shockingly drunk, and he seemed surprised at our refusing to join him in drinking raw spirits. The liquor is made in 'Sanaa, and tastes like bad whiskey. His Highness when in his cups, became so excessively liberal, that he desired us to look round, and take any thing we liked. We seized this opportunity of requesting unlimited leave to walk about the town, and neighbourhood, and in fact to do as we liked. All was instantly granted, but unfortunately his Highness was too tipsy to recollect his promise. On the day following this we managed to get out, and discovered on the walls of some houses several inscriptions in the same character as those at Hussone Ghoráb, a copy of which is annexed. We were the more pleased, because Niebuhr could not discover any. We were told that these stones were brought from the ancient city of Mareb, situated N. E. from Sanaa seven days' journey. On inquiry, we found that the country round the ruins of Mareb was called "Urd é Saba" or the land of Saba. We were assured that after the rains, square pieces of gold coin are found, and many inscriptions in the same character, cut in marble. Statues and broken columns are also numerous, and I luckily secured a marble head of a figure which originally stood about three feet high, in the gardens of the Imaum. Our determination was instantly formed to reach this point, but unfortunately Dr. Hulton's health began to fail, and he soon became dangerously ill. Unwilling as we were to lose this very interesting trip, we found ourselves compelled to do so, and hope for some other opportunity at a future time. That the "Urd é Saba" is the ancient Sabaa seems pretty certain. We are aware that Christianity was early adopted in that part of Yemen, and we were *voluntarily* told by several well informed men, that stones were frequently found having on them the representation of "a woman holding a child in her arms" and that the "child had something round its head like a star !" We offered high prices for any specimens either in stone or coin, but the season was over, and we were unsuccessful. It would doubtless prove a rich field for the antiquary, and it is possible to get there by paying for an escort. We had agreed with an Arab sheik to take us, but I have already stated the reason we did not go.

The inscriptions which were procured, agree in character precisely with those we found at Negeb el Hadjer. They were at first supposed to be the ancient Hamyaritic, but have since been supposed to be Ethiopic, which would make them not so ancient. The charac-

ters are perfectly plain, and in good order, and, with the exception of the stone being chipped round the edges, are almost as plain as when first cut. We were repeatedly told that in the neighbourhood of Mareb, such inscriptions were so numerous that we "could not copy them in a month." The bigotry of the Arabs induces them to destroy any thing they find which approaches to idolatry, and, in consequence, I only succeeded in procuring the head of a figure, which I was assured, had been perfect but a few months before.

The Imaum has two palaces in the city, one the Bistanel Mutwukkil, and the other the Bistan el Sultaun; and he resides in them alternately. The Bistanel Sultaun is, if any thing, the finer building of the two, and of more modern construction, but both are mentioned by Niebuhr. Both are much superior to any thing of the sort I have ever seen in Arabia, and at a distance they would be termed almost magnificent. They are surrounded by extensive gardens, and the apartments in the lower or ground floor are mostly large saloons, very splendidly furnished, and having a large basin and fountain in front, with perhaps twenty jets of water to the height of thirteen or fourteen feet. Our residence in the "Bir el Asab," was remarkably pretty; it consisted of four rooms composing a hollow square, in which was a fountain overshadowed by an immense vine loaded with grapes. All four rooms opened into this square, and were fitted with cushions, carpets, &c. and the never failing stand of seven or eight hookas. The house itself was completely hid from the public street by a number of large walnut and apricot trees.

The people of Sanaa never use the coffee bean, but employ the husk which they call "Kishr," and which is prepared in the same manner. I had frequently before tasted this preparation in the Tehama, but never enjoyed it so much as in Sanaa, where it was of the finest quality, and formed a most refreshing beverage after a day's fatigue. The natives say that the bean of the coffee is too heating, and is liable to throw a person into a fever; but, like many others when advocating the use of their favourite beverage, they declare that the coffee husk or "Kishr" is an infallible remedy for all disorders.

For four years previous to our visit, as before stated, no rain had fallen, and as this was the month in which rain usually falls, the people were very anxious about it, and we were requested by the Imaum to look at the stars with our instruments, and inform him when the wished for showers would fall. As we had experienced much rain a day or two previous to our arrival at Sanaa, and the wind still

hung in the same quarter, the Doctor boldly declared that in forty-eight hours or less rain would fall. As luck would have it, before six hours had elapsed, a very heavy shower of rain came on which lasted all night, and during the time we were in Sanaa, scarcely a day passed without occasional showers. The four years of drought had caused a complete famine in the land, and raised enormously the price of every article of provisions. I have a statement showing how the prices of the common articles of daily consumption rose, and from this, the distress of the labouring classes may be conceived. Whenever we went out of our house, we were assailed by a mob of famished wretches, who, finding no relief from the charity of a Musulman, condescended to beg from an unbeliever ; and in passing through the streets, the bodies of men, women, and children, lay here and there, without any body offering to bury them. The only remark made by a wealthy merchant, who was walking with us one day, was, " What can I do ? It is God's will, and we bow to it." The object that excited this remark was a poor woman, whose husband and two infant children were lying beside her starved to death, and who was vainly endeavouring to excite the charitable feelings of the passers by, to give her family a decent burial. On our arrival here, at least one hundred and fifty funerals passed through the gates every day, and I may safely say that of these, thirty were caused by starvation. Some of the merchants wishing to be considered charitable, regularly fed thirty or forty people, as they said, but it turned out that all the food they gave, was *over ripe fruit*, chiefly grapes ! On our arrival, Sanaa was very unhealthy, and Dr. Hulton's opinion was that the climate was much too dry to be healthy. The rain that fell during our stay stopped in some measure the ravages of the fever, but the Sananees themselves said, that this part of Yemen is much too dry even for their constitutions. I enjoyed excellent health, but my friend fell a victim to the baneful influence of the climate after a lingering illness of six weeks.

Coffee will not grow in Sanaa, though the experiment has frequently been tried; it appears either that the climate is too cold, or the soil is too rich. Fruits of all kinds, however, grow here in abundance. Amongst these we noticed grapes, almonds, figs, pomegranates, plums, apricots, peaches, a small kind of pear, plantains and walnuts. The rich householders have large vineyards, covering perhaps an acre of ground, where the vine is supported on a trellis work about four feet high. From a small white grape called " el Baitha," they make tolerable wine, and they also distil

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a kind of spirit from barley. Fruit appeared to us to form the common food of the lower classes. Grapes where daily exposed in large quantities for sale, and the venders were commonly Jews, who chiefly supply the market, and are besides the best artisans in the city.

There are several Banians in Sanaa, one of whom, considered the chief, annually pays a tribute of one hundred dollars to the Imaum, and thirty dollars to the support of the mosque. On the death of one of this class, half his personal property goes to the Imaum, and the other half to his heirs or partners. They trade largely with India and are esteemed rich.

The Jews form another important branch of the population of Sanaa. In Niebuhr's time, the town they resided in was separated from the city, but it is now included within the walls of the Bir el Asab. They are the chief workers in gold and silver ornaments, and, in fact, are almost the only artisans in the place. We went to their synagogue on their Sabbath, and were shown a very beautifully written copy of the law on a scroll of leather. Their women were the most lovely I almost ever saw. The total number of the Jewish population may be about 4000.

The people of Sanaa are of the Zeidee sect, chiefly differing but little from the Sheeas, or followers of Ali. They are of course as bigotted as other Moslems, but nevertheless frequently engaged in a good humoured dispute with me about our religion. We were invariably treated with the greatest hospitality wherever we went, and had never to complain of any insult offered by the populace. Unfortunately our agent was a rascal, and when he found that we would not be subservient to his wishes, he privately told the Imaum, that we ought not to be allowed to walk about the city copying inscriptions, and sketching houses, and, in consequence, we were detained in our house for six days, when luckily the Imaum feeling unwell sent for the Doctor, from which time we were again at liberty. But we unfortunately were not able to profit by our newly acquired freedom as much as we desired, in consequence of Dr. Hulton's illness.

The city of Sanaa is situated in a deep valley perhaps seven miles in breadth, and twenty or thirty miles in length, bounded on the east by a lofty mountain called Jibal Nieggum, and studded all along with large villages. We visited two of these, viz. Roatha and Waddy Dtharr. Their population may amount to one thousand five hundred each; and we considered that thirty thousand would not be too much for the city of Sanaa. Taking these towns and the numer-

ous other hamlets which are scattered over the plain together, I do not think there would be less than seventy five thousand souls. The houses are all tenanted, and unlike other cities, such as Aden, &c. Sanaa is still as populous as ever, though owing to the negligence and apathy of its governors, it is fast verging to its fall, and will be an easy prey to the enterprising Egyptian army now in Yemen.

Within two days journey from Sanaa, iron ore is found, which is worked up by the Jews into swords, &c. it is however too soft, and a stroke of an English sword would almost cut in two any Sanaa weapon. Saltpetre is also found in Waddy Dthar with which the Bedouins manufacture their own gunpowder. Marble is found at a place about seven miles distant, called Hussone Baresh; also a kind of chunam, superior to that made in India, which is used to whitewash the interior of the houses. With the exception of a thick kind of cotton cloth, there are no manufactures in Sanaa. The Bedouins weave a coarse species of Camoleen or "Abba," similar to those used in Socotra, but all other piece goods are brought from India in exchange for coffee. In ordinary years, rain falls in Sanaa three times: first in the latter end of January, but in very small quantities, and frequently none at all; secondly in the beginning of June, when it falls for about eight or ten days; at this time the seed is sown, and the cultivator looks forward to this season with great anxiety. Thirdly, at the latter end of July, when it is in the greatest abundance. A few farmers defer sowing till this period.

In July, the N. E. wind prevails during the day, but declines in force towards the afternoon; it is met by a current of air from N. W: lightning, thunder, and rain generally follow.

After rain has fallen for three or four days, the mountain torrents rise with great rapidity, and become formidable obstacles. On our return we experienced the effects of one of these sudden rushes of water; our mules were washed off their legs, and the horses were barely able to stand against the current. In the Tehama particularly, the face of the country is changed in an inconceivably short time. The fields being surrounded by dykes, they each form large pools of water, and Zebid in particular was almost inundated; the road between that place and Mooshej was impassable. Such however, is the sandy nature of the soil, that forty-eight hours is sufficient to restore every thing to its former parched appearance. And the grass has scarcely time to shoot, before it is again burnt up by the heat of the sun.

Regarding the provinces in the neighbourhood of Sanaa, we could

not gain any precise information. The authority of the Imaum, however, does not extend two days journey to the N. W. and the people are generally hostile to him. The Imaum has not more than 2,000 fighting men in his dominions; but when engaged in war, he calls in the assistance of mercenary troops.

The country to the south of Sanaa, as far Aden, formerly belonged to the Imaums of Sanaa, but the inhabitants now set him at open defiance; and it was his intention to collect an army to chastise the rebels, when his plans were stopped by the appearance of the Turkish army. Two very powerful tribes, the Do-Mohammed and Do-Hussein, living in the southern part of Yemen, would be sufficient to check the progress of the Egyptian troops, were the former only reconciled with the Imaum. A debt of 1,50,000 dollars is the cause of the rupture between the former Imaum and these powerful tribes, and the late conduct of the reigning prince, in endeavouring to seize his uncle, has widened the breach. Owing to some fancied conspiracy, the Imaum sent orders to seize the person of his maternal uncle, Seedee Gassim, and confined him in the state prison. He, however, escaped by night, and took refuge in Taes with the Do Hussein. Here he assumed the name of El Hadi, and, as the people of Yemen have a legend that El Hadi is the name of the reviver of their religion, they flocked to his standard in great numbers. He sent to the Imaum during our stay, and demanded of him to "resign the seal of the Imaum," but not thinking himself strong enough to attack Sanaa he was making overtures to the Turkish governor of Mocha, when we sailed from that place in September, 1836.

That the Egyptian troops will eventually take Sanaa, there seems to be little doubt, but I do not think they will be able to remain there, for the walls of Sanaa are so extensive that, it would require an Army of at least 15,000 men to defend the place against the continued attacks of the Bedouins. Neither could they obtain a sufficient quantity of provisions. The prevailing opinion, when we left, was, that Mohammed Ali would establish the present Imaum's uncle Seedee Gassim as governor, and content himself with an annual tribute. Great preparations were making at Hodeida and Mocha for the total subjugation of Yemen, and their success seems pretty nearly certain: still, were the Imaum to call in the neighbouring tribes to his assistance and *pay them well*, there might be a chance of defending his country successfully against these invaders.

Dr. Hulton's illness detained us at Sanaa for nearly five weeks. At the expiration of that period, through the kindness of a merchant

I procured a litter for him. The Imaum sent for me previous to our departure, and after regretting the illness of Dr. Hulton, presented us with two young horses, and bid us adieu. We returned by the same route to Mocha, and arrived there in fifteen days.

In apologizing for the brevity of this paper, I may be permitted to remark, that after the illness of my friend, my time was so constantly taken up in attending him, that I rarely moved out of doors. I have no hesitation in saying, that Yemen, and particularly the north eastern part of it, would prove a most interesting field of discovery. And, in conclusion, I can only regret that I had not more time to explore the country, and that I was deprived of the assistance of my friend in drawing up these hasty remarks.

VI.—*Note on Perim Island in the Gulf of Cambay.* By Lieut. R. Ethersey, I. N.

Perim island, situated in the Gulf of Cambay, is in latitude 21° 35′ 19″ N. longitude 72° 34′ 48″ E. It is one thousand eight hundred yards long, and from three to five hundred yards wide, lying N. N. W. and S. S. E.: bears from Gogah 39° E. distant four and a half miles, and lies two and a half miles off shore. It is a singular island surrounded by an extensive rocky reef, which on all sides, except the south, is steep; eleven and twelve fathoms water, in several parts, being within five and ten yards of the rocks forming the reef.

At low water spring tides, the channel between it and a rocky reef in the centre, is only one thousand two hundred yards wide, and has an extraordinary depth of three hundred and sixty feet, the bottom yellow clay. Due west of the light there is two hundred and forty feet, and to the northward of the deepest part of this channel, which is N. N. W. of the island, the depths gradually decrease to one hundred and eighty feet due west of the north end of the reef. On the S. E. side of the island there is a depth of one hundred and ninety-eight feet within three quarters of a mile of the reef, which decreases towards the north to one hundred and sixty and one hundred sixty-eight feet, rocks, and rocks and sand.

It has been surrounded by a strong stone wall, a part of which is still visible on the western side, and the ruins of it are apparent all round; in that part which stands on the western side, there is a door-way, composed of large well cut stones, and is very similar in appearance to that on the island of Shalbet. There are some ruins immediately inside this door-way, which are nearly buried beneath the

loose sand; at the N. N. W. end there are also some other ruins, but not extensive. Half way between the light and the N. N. W. end, there are the remains of a tank, which from the side which still stands, appears to have been well built, but of no great extent.

The light tower stands on a high sand hill, and is composed of solid masonry; is twenty-six feet high, out of which rises a spar sixty feet, upon which the lanthorn is shipped, the whole being supported by shrouds. The light consists of eight burners, and is one hundred and two feet above high water mark. Hills of sand line the west side, and both ends of the island; general height from twenty to forty feet. The S. E. side is low and covered with a little vegetable mould mixed with stones, which admits of cultivation, although on a small scale.

Besides the lascars belonging to the light establishment, a number of coolee families reside here during great part of the year; they have a few cattle and goats, which find a scanty subsistence about the low grounds.

The island is composed of tertiary strata; the S. S. E. end terminates in a cliff which exposes horizontal beds of puddingstone, which are separated by sandy clay; the order of superposition is as follows, commencing from the surface.

	Ft.	In.
Reddish mould mixed with stony rubbish	3	0
1 Yellow puddingstone	1	6
2 Sandy clay	1	0
3 Dark coloured puddingstone	0	6
4 Sandy clay	4	0
5 Yellow puddingstone	1	0
6 Sandy clay	0	6
7 Recent sandstone	0	6
8 Sandy clay	8	0
9 Yellow puddingstone	1	2

At high spring, the tide flows above the last stratum. None of the beds appear to dip, and none preserve an uniform thickness throughout the cliff, and in one part, the sandstone disappears altogether. Figure 3. is a section of an angle of the cliff; the strata in the same order and thickness as above, which were measured at this part; the numbers refer to the specimens which accompany this.* This part appears to be an elevated mound, as no appearance of rock is to be seen on the other side of the sand hills, although

* In the Society's Museum.

they are not more than from eighty to one hundred yards wide, which appears more probable from the circumstance of a well having been dug at the foot of the hill, on which the light house stands, at an elevation of eight or ten feet above high water mark, and no rock was met with until twenty-three feet had been excavated, through sand and sandy clay, when a stratum of puddingstone was cut through, which was three feet thick, when water immediately flowed. The section (Fig 2). of the S. S. E. end of the island in a line E. N. E. and W. S. W. will give a better idea of my meaning.

On the dry reef which surrounds the island, no regular strata are discernible, the whole being confused heaps of rock mixed with mud, sand, and clay; the rock is chiefly yellow puddingstone (breccia) in which, on the S. E. end of the island, most of the fossil remains were found. There is one exception however to this, which occurs on the western side of the island, where at low water spring tides, I observed a regular horizontal stratum of yellow and a reddish yellow clay, extending nearly one mile to the southward. In one part, this rises into a cliff eight and nine feet high, but in general it only shows itself a foot or two above the water. No. 10 and 11 are specimens of the cliff, the face of which is curiously marked by curved lines, and is full of little excavations, apparently the work of some testacea. About two hundred yards to the north of this cliff, there are several large blocks of rock, of which No. 12 is a specimen; the top of the highest of these is on a level with the top of the cliff, and as they rest upon yellow clay, it is probable they are not in the position they originally occupied. Fig 1. is a view of the cliff from the westward. No. 14 is a specimen from a small reef on the opposite side of the channel, the whole of the rock resting on yellow clay, proceeding across to the main. No. 4, 13, and 14, are the rocks met with, lying in confused broken masses, mixed with clay, sand, and mud ; no regular strata to be seen, and the rock disappears altogether above high water mark. The coast is lined with sand hills. I examined several small water courses inland but could not discover rock.

There are large rocks in twenty-eight and thirty fathoms on the E. and N. E. side of the island, but I have never been able to procure a specimen. The upper part of the clay cliff, of which Nos. 10 and 11 are specimens, is twenty feet from the lower part of the stratum of puddingstone, No. 9 of Perim Bluff.

LIST OF MINERALS REFERRED TO.

1 Conglomerate, composed chiefly of quartz, sand, and pebbles, united by a clay basis.
2 Saliferous soft sandstone.
3 Puddingstone.
4 Breccia.
5 Sandstone (fine grained).
6 Conglomerate, nearly the same in composition as No. 1. with the pebbles of larger size.
7, 8, and 9, not received.
10 Laminated clay.
11 Laminated clay.
12 Not received.
13 Coarse sandstone or granular quartz rock, highly ferruginous.
14 Conglomerate, composed of broken marine shells and quartz pebbles, imbedded in an argillaceous cement.

VII.—*Illustrations of the Arab and Persian Geographers, or the Geography of the Middle Ages.* By James Bird, Esq.

The anarchy and decay, which divided the government and weakened the institutions of the Roman empire, made easy the conquests of barbarians from the north; who, in the fifth century of our era, overran the fairest countries of Europe, destroyed their civilization, and extinguished the light of literature and science. Geography shared in the darkness which overspread other departments of letters; the magnificent library at Constantinople was destroyed by conflagration; and the knowledge of ancient geography, which, from a survey of the Roman possessions, embracing their military roads and provinces, had augmented with the extent of the empire, almost became extinct. In the seventh century, the Khalif Omar, having ordered the Alexandrine library to be burned, completed the reign of ignorance which commenced with the Goths and Vandals. It continued till the middle of the eighth century, when the Khalifs of the house of Abbas, moved by an ardent love of science and literature, founded the city of Baghdad, to which the learned men of all countries flocked to experience the protection and favor of this noble race of Mohammedan Sovereigns; and while their munificence called forth the talents of their countrymen, it drew to it the learning and the genius of other nations. About A. D. 754 the Khalif Al-Mansur, second of this house, introduced a taste for Astronomy. Ptolemy, the greatest of Roman geographers, who had collected and improved the knowledge of the latitude and longitude of places, bequeathed him by Eratosthenes and Hipparchus, was soon after

translated from Greek into Arabic: a mutilated copy of which work, known by the name of Al Majisti, exists in the library of the late Mulla Firoz of Bombay. But, before proceeding to illustrate Arabian geography, it is necessary to say a few words regarding the Arabic geographical treatise, named *Masalik-wa-Mamalik*, or routes and kingdoms, which was some time ago presented to the Society by Sir Alexander Burnes. For the better understanding also of the extent of geographical knowledge in the middle ages, it is essential to give some account of the Arabic geographical system, and to translate entire the very curious preface to the work of Masudi, called *Muruj-az-Zahab-wa-Muadin-al-Jawahir*, or the meadows of gold and mines of jewels. Previous to proceeding to the geography of particular countries, and the illustration of the *Masalik-wa-Mamalik*, I will in future papers follow the plan now proposed.

THE GEOGRAPHICAL WORK CALLED MASALIK-WA-MAMALIK.

In a former number of our proceedings, there is a note stating that this work, which is in Persian, had been compared by me with Sir William Ousley's translation called the Geography of Ibn Haukal, and found to be precisely the same. At the end of the copy it is said to be a translation from the Arabic, by Abu Mahasin Mohammed Saad; the original author of which is, according to Moeller's catalogue of Oriental Manuscripts in the library of the Duke of Sax Gotha, * named Abu Ali Ishak, the judge of Istakhar, commonly known by the name of Istakhari. The work is otherwise known by the title of *Kitab-al-Akalim*, or the book of climates, and the author is mentioned in the cosmographical work of Zakaria-bin-Mohammed, commonly called Kaswini. He appears to have flourished Hej. 244, A. D. 858, and preceded Ibn Haukal who borrowed from him. In the preface to the present translation it is said, "thus speaks Mr. Ishak, that our desire, in composing this book, is to bring to recollection all the countries of the world which have adopted the faith of Islam; and we have so divided it as to embrace in each climate every known town; and whatever regarding the cities, the environs, the hills, the rivers, the seas and the deserts, may be found in each climate, has been detailed, and everything unnecessary left out. We have arranged this book

* Catalogus librorum tam manuscriptorum quam impressorum qui jusu Divi Augusti Ducis Saxo Gothani, a beato Seetzenio in oriente emti in Bibliotheca Gothana asservantur, Auctore J. H. Moellero, Appendix Particula Prima, page 8.

after the manner of the seven climates, &c. and have called it the *Masalik-wa-Mamalik* "

The name *Masalik-wa-Mamalik*, seems to signify an universal geography, and was applied to the celebrated work of Edrisi the Nubean Geographer. Masudi also says that it was the title of a work by Abdallah-bin-Abdallah, commonly called Ibn Khurdadbah, of whom he thus speaks; "He was the best of compilers and the first of authors, as those who wrote after him followed his example and quoted his authority. If you are anxious to investigate this subject, look at his great historical work which contains more matter than any other history whatsoever, and surpasses all in arrangement and science. It embraces an account of the different tribes of Ajam, or those not born in Arabia; but one of his best works is the *Al-Masalik-wa-Mamalik*, which if you seek after you will find, and will approve of if you can judge."

A variety of works named *Masalik-wa-Mamalik* appear, therefore, to have existed, the authors of which probably copied from each other, and gave by their extracts a similarity of character to the whole. This has induced Sir William Ousley to think that the work translated by him was that of Ibn Haukal. The original author, however, appears to have flourished towards the end of the eighth century, and this opinion is corroborated by a fact, mentioned in the manuscript, that during his time, Andalus, or Spain, was governed by Al-Hakim, the son of Abd-ar-Rahman the son of Moaviah, who conquered it in the beginning of the Khalifat of the Abbasides. He also says that at this time the Abbasides had not yet read the Khutbah in their name.* It is not likely that Ibn Khurdadbah was the original compiler, as his age is usually placed in Hej. 300, or the beginning of the tenth century, and the whole of the evidence is indeed in favor of the correctness of Moeller's opinion, that Al-Istakhari was the author.

In the commencement of the work the design of it is detailed, and begins from Arabia, where is situated the holy Kaaba, called the navel of the world, in imitation of the Greeks, who assigned similar honor to Delphi. The sea of Persia, the western countries of Africa, Egypt, Syria, the Mediterranean ocean, Mesopotamia, Khuzistan or Susiana, Fars, Mansurah, Sind and Hind, Azerbijan, Kohistan, Dilman, the sea of Khozar or the Caspian, the various nations surrounding it, the deserts between Khorasan and Fars, the provinces of

* This is a prayer for the reigning King read every Friday in the principal mosques.

Sistan, Khorasan and Mawar-an-Nahar, with all the countries where reside true believers, are next described. The copy forwarded by Sir Alexander Burnes, appears in many parts more full and correct than the one from which Sir William Ousley must have made his translation; and in illustrating the geography of particular countries, I will avail myself of its information where such seems more detailed.

Only the eastern and northern parts of Africa are noticed, and as little information is given on the state of Europe or India, I will, in these illustrations, have recourse to the works of Masudi, Ibn Al-Wardi, the Sherif Al-Edrisi, the Maajam-al-Baldan, the Nafha-at-Tib of Shaikh-Shahab-ad-din Ahmed-al-Muckri, and the tables of longitudes and latitudes by Nasir-ad-Din Tusi and Alagh Beg.

Account of the Most Celebrated of the Arab Geographers.

The Khalif-Al-Mansur, first among the Abbasides who dedicated himself to science, became equally skilful in the laws of his religion, as in philosophy and astronomy. Under his auspices works on various subjects were translated into Arabic from the Syriac, the Coptic, the Greek, and the languages of India and Persia. At this time the astronomer Mohammed-bin-Ibrahim Alfazari flourished, and though astronomy was before known to the Arabs, it made great progress under the patronage of the liberal princes who gave celebrity to this noble house. When the sceptre of the Khalifat descended to Al-Mamun, the seventh of this race, the knowledge of this science was carried to yet greater perfection ; and the Khalif, determined to seek knowledge in her native haunts, requested that the kings of the Greeks would send to him such philosophical books as they had amongst them, and having sought for skilful interpreters, he caused them to be accurately translated. His father Harun-ar-Rashid, during his life time, had assigned to him the countries of Khorasan and Mawar-an-Nahar, which he governed as vice-royalties. At his succession to the undivided empire, A. D. 812, being still attached to these countries, he made Tus (now Meshid) his capital, and place of his residence. It thus became the rival of Baghdad, and the resort of many learned men.

Among the astronomers who flourished at this time, was the arithmetician Habash Marwazi, a native of Baghdad, who wrote three books of astronomical tables; of which the first was composed, accord-

ing to Abul Farij,* after the rules of the *Sind-Hind*, a book mentioned by Masudi; the second, named *Al Mumtahin* embraced the result of his own observations; and the third, which contained the lesser tables, was known by the title of *Al Shah*. Among other celebrated astronomers who flourished at this time, the names of Ahmed Ibn Kothair Al-Farghani, Abdallah Ibn Sahil, and Mohammed Ibn Musa Khawarismi, are particularly distinguished. The first wrote an introduction to astronomy, in which he clearly detailed the rules of Ptolemy, and the last is the author of the tables known by the name of *Sind-Hind*, which were used both before and after the Arab astronomers began to make observations.

At this time Al-Mamun invited a number of celebrated men to Baghdad for the purpose of making observations and of improving astronomical instruments then in use. Among these was Yahia Ibn Abil Mansur, a person of great repute, who was at that time living at Mekka. The astronomical observations made at this period were carried on at Shemasia, in the province of Baghdad, and at mount Kasion in the immediate neighbourhood of Damascus. The obliquity of the ecliptic was determined to be 23° 35′; and, on the authority of Masudi, a degree on the earth's surface at the camp of Sinjar, between Rakka and Palmyra was found to be fifty six miles; which multiplied by 360°, again multiplied by 7 and divided by 22, according to the rule of Archimedes for finding the diameter of the circle, gave the diameter of the earth at six thousand four hundred and fourteen miles, being an error of one thousand five hundred miles less than its true diameter.

The Khalif Al Mamun was succeeded by the Khalifs Al-Mutasim, Al-Wathik, and Al-Mutawakkel, the last of whom was slain by his Tartar slaves, A. D. 861. During the reign of the former Al-Hasan Ibn Sahil Nubakhti flourished, and is the author of a book on the mansions of the moon. He appears to be the same person who is said to have stated the circumference of the earth at twenty-four thousand miles, an estimate not very far from the truth. About this time also Honain Ibn Ishak, and Sabit Ibn Korra, were held also in great estimation, and translated several medical, mathematical, and astronomical treatises from Greek and Syriac into Arabic. The former was a Christian of Hira, who translated Paulus Ægineta

* See Tarikh Mukhtasar-al-Dawal, or Gregorii Abul-Pharajii Historia dynastiarum Arabica, edita et Latine versa ab Edvardo Pocockio, page 161.

and the Syntaxis Majisti of Ptolemy; the other was a Sabean,* of Harran in Mesopotamia, who corrected the last work.

Ptolemy Claudius, the mathematician, is among the Arabs esteemed to be the first who made a globe and delineated the Astrolobe, and four of his works are known amongst them, viz. his syntaxis called Al-Majisti, his book of geography concerning the figure of the earth, his longitudes and latitudes of places, and his opinions on the influence of the stars. The first translation of the Al-Majisti appears to have been from Greek into Syriac by Honain-bin-Ishak; it was subsequently translated into Arabic, in the middle of the tenth century; and into Persian in the middle of the thirteenth of our era. The translation from Syriac into Arabic is by Mohammed the son of Yahia, the son of Wafa Al-Buzjami of Nishapur; and that from Arabic into Persian was made by Nasir-ad-Din Tusi.

In the beginning of the tenth century, several astronomical observations were made in the town of Rakka of Mesopotamia. The philosopher and mathematician who made them, was Mohammed Ibn Jiaber, of the town of Batan, a dependency of Harran, who is usually called Al-Batani, and died A. D. 929. He is said to have been the most accurate of all the Mohammedan observers of the stars, and to have extended his investigation to ascertain the extent of their movements.

* Note. The religion of the Sabeans appears to have been very similar to the followers of the Vedas among the Hindus, and the account of it given by Gregory Abul-Farij is very curious. The things pertaining to this religion were written in Syriac, such as their laws, their precepts, and their rites, the manner of covering and burying the dead; concerning cleanness and uncleanness; what animals were suitable or not suitable for sacrifice; the times appointed for divine worship; and the appointed lessons at their prayers. That, however, says Gregory, which concerning the sect of the Sabeans is manifest to us, is, that their profession is entirely the same as that of the ancient Chaldeans; viz. that their Kibla is the north pole; that they diligently observe the four cardinal virtues; and that it is enjoined to them to pray three times; first, half an hour or less before the rising of the sun, so that the eight incurvations, each of which embraces three acts of adoration, may be finished during his rising; secondly, that their midday orisons, consisting of five genuflexions, each comprehending three acts of adoration, may be finished during the sun's declination; and that the third orisons, similar to the second, should terminate with his setting. The fasts fixed for them are one of thirty-days, of which the first is the eighth of the month Azar, one of nine days commencing on the ninth of Al Kanun the first, and one of seven days which begins on the eighth of Shebat. They teach the worship of the stars, to which they offer many sacrifices without eating any part, the whole of which is consumed by fire; they abstain from the use of beans and onions; some also do not eat pulse, cabbage, colewort, or lentils. Their discourses are similar to those of the philosophers, but their arguments to prove the unity of God, are much more convincing. They think that the souls of the wicked are punished for nine thousand years, and are then restored through the mercy of God.

Not long after, and during the reign of the Khalif Moti Lillah, the celebrated historian Abul Hassan Ali, commonly called Masudi, wrote his geographical and historical works, of which the last, *Muruj-az-Zahab-wa-Muadin-al Jawahir*, or *the meadows of gold and mines of jewels*, was begun in A. D. 943. In his cosmographical preface to this work, he states that he had travelled in Sind, Zanj, Sanf, Sin, and Ranij, (Burmah), and that at this time science had already perished, in as much as men laboured not to acquire it, and left its cultivation to ignorant pretenders who satisfied themselves with vain hypotheses. He was a native of Baghdad, who subsequently established himself in Egypt, where he died in Hej: 345, during the month of Jumadi-as-Sani, or September A. D. 956. Mesihi says of him in his annals that he was well acquainted with history, and that in this matter he was very learned, possessing a multitude of curious facts, piquant anecdotes, and valuable outlines of knowledge. He composed a great number of works, of which several are mentioned in his preface to "The meadows of gold and mines of jewels."

In the time of Masudi, the Arabs carried on a great commerce with China, and are said to have traversed the country through its whole extent. Their vessels sailed from Basrah, Siraf, Oman, India, Ranij, and Sanf; and all strangers, who then frequented China, were allowed to visit the Court of the Emperor. Among others who made this voyage, Mohammed Abuyezid, an inhabitant of Siraf, is mentioned. He appears to have gone to China, A D. 915, and is, some think, the same as Abuzaid, one of the two Mohammedan travellers mentioned by Renaudot, whose journey has been usually placed A D. 877. Several centuries prior to this time Buddhaist missionaries had come, from China into India, with a view of inquiring after the principles of their religion which had originated in the latter country. In A. D. 842, the Khalif Wathik, according to Al-Edrisi, had also sent a person from the city of Saumrah, on the Euphrates, to report on the rampart of Yajuj and Majuj, or that frigid region, beyond the confines of the country possessed by the Turks, which was subject to continual snow and rain. Salah the interpreter, who undertook this journey, travelled by Teflis, Al-Sarir, and Lan, on the western shore of the Caspian, to Bashgird on the Volga; hence through the country of the Votiaks, on the river Viatka, to the mountains between the sources of the Irtish and the Jaxartes. After an absence of twenty-eight months he returned to Saumrah on the Euphrates; and travelling by Botan, and the lake of Taran, into which

the river Soghd emptied itself, he visited Samarkand and Khorasan, in which latter province Abdallah the third of the Tahir dynasty was then ruler.

Under the guidance of the house of Abbas the affairs of the Khalifat had been conducted with vigor for more than a century, when, at the death of Mutawakkil, its power began to languish; and Arabic literature, which owed to the princes of this house its origin, now began to decline. The Tartar slaves and mercenary chiefs had at their disposal the resources of the government, for nearly eighty years, embracing twelve successions. Literary institutions were less liberally endowed, and the crowd of learned men, who adorned and nobly supported the court of Baghdad, were now scattered to seek rewards and honors under the patronage of other sovereigns, who, at this time rose into power. Soon after the death of Mutawakkil, the first of the Sufauriah dynasty revolted and obtained possession of Sistan, Khorasan, the Kohistan, Kirman, and the whole of eastern Persia. This family was soon succeeded by that of Saman, and the race of Sabuktagin in Ghaznah; while the family of Buwaiha, taking possession of the provinces of Fars and Persian Irak, established their metropolis at Shiraz, and left nothing but the supreme ecclesiastical dignity, or Imamat, to the Khalif at Baghdad. Azad-ad-Daulah and Sharf-ad-Daulah, the second and third of this family, were liberal patrons of learned men; and the former had for his preceptor the astronomer Abd-ar-Rahman Al-Sufi.* The latter patronized Mohammed Al Sagani Abu Hamid, who was distinguished for his knowledge of geometry and astronomy, and is said to have constructed, at Baghdad, instruments for observing the stars with the greatest accuracy. Sharf-ad-Daulah having an observatory in the citadel there, this astronomer was ordered to make observations on the seven planets, in which he was assisted by the astronomer and geometrician, Ibn Washan Abu Sahil; both of whom published a compendium of their observations. The latter made observations on the entrance of the sun into the signs of Cancer and Libra, during the year 1299 of Alexander's era, or A. D. 976; and about

* Doctor Dorn in his description of an Arabic celestial globe, presented to the Royal Asiatic Society by Sir John Malcolm, says, Ibn Alnabdi, who was himself an extremely clever mechanic, mentions two globes which he had examined, and the excellent execution of which he had admired in the public library at Kahira in A. D. 1043. One of them he describes to have been made of brass by Ptolemy himself, which, of course, cannot be adduced as a proof of Mohammedan skill; but the second, made of silver, was constructed by Abul Hassan Alsufi, for the immediate use of the king Azad-ad-Daulah.

this period his patron founded, in the city of his nativity, the celebrated university of Isfahan, which flourished for many centuries, and enjoyed the reputation of being the best school for philosophy and medicine.

Arabic had been the language of the laws, the literature, and the science of Persia for nearly three centuries, when the Persian was restored to its ancient honor by the celebrity of Firdausi, and the patronage of Mahmud of Ghaznah. At this time several poets of celebrity were employed to turn into verse the Pehlvi legendary tales and chronicles of Persia; and the Ajamian (barbaric) tongue, which had lost its purity and harmony, by the admixture of a harsh foreign language, obtained consideration among the Mohammedan princes of the dismembered Khalifat, who gloried to number among their friends the celebrated poets and philosophers of their age. Arabic however still continued to be the language of business, and was used in important works that treated of liberal arts and sciences; and Persian, though employed by the poets, did not become the language of the astronomers and geographers until several centuries afterwards.

Under Sultan Masud, A. D. 1038, Abul Rihan Mohammed, the son of Ahmed Al-Biruni, a distinguished mathematician and author of many works, published the *Kanun-al-Masudi*, or *astronomical tables*, in imitation of those of Ptolemy. He is called by Ferishta Anwari Khan Khawarezmi; and is said by others to have been profoundly learned in the various schools of philosophy among the Greeks and Indians. According to Gregory Abul Farij, he went to India, where he acquired the learning of their school, and in return taught their learned men the manner of philosophizing among the Greeks. The books he composed were many, his opinions were altogether trustworthy and founded on fact, and in short, says Gregory, he had no rival either in that time or in this, who more clearly understood astronomical science, or who could more thoroughly search into small or great matters.

The most illustrious, however, of Arabian geographers, and the best known to Europeans, is the Sharif-al-Edrisi; who, in A. D. 1153, wrote his geographical work, the *Nuzhat-al-Mushtak*, or *recreation for those who wish it*, which was translated into Latin by two earned Maronites, and published at Paris under the title of the Nubean Geography. It was written, by order of Roger, king of Sicily and Antioch, in explanation of a silver globe, weighing four hundred

pounds, on which was described the figure of the earth, its countries, cities, and general features. The arrangement observed in the work is that usually followed by Mohammedan geographers; who, commencing at the equinoctial line, divide the world into seven climates, and extend northwards to where cold renders the earth uninhabitable. Our author belonged, as appears, to the illustrious family of Edrisi, who formerly ruled in part of Africa, and took his title of Sharif after the manner of those who claim affinity with the prophet Mohammed, and account themselves his descendants. The work, known by the name of the Nubean Geography, is a very imperfect translation of the original, and is disfigured by numerous errors in the names of places, which more extended oriental knowledge, and geographical research, have rendered familiar to us. A new translation, from the Arabic, by the Rev. G. C. Renouard, has been for some time promised to the learned, by the Oriental Translation Fund of Great Britain, and is a thing much wanted, as it promises to be useful to geography at large.

Six years prior to the time when Edrisi wrote, navigators from Lisbon performed that singular voyage, westward on the sea of darkness, *Bahar-al-Muzlim* (*or Atlantic,*) which is mentioned by Ibn-al-Wardi and our author. Having equipped a vessel with provisions, necessary for a long voyage, they swore that they would not return till they had reached the end of that sea and land, which must be, they thought, to the west. After advancing for twelve days in the open sea, they were carried for twelve days more into a sea of unfathomable depth, where there were immense waves; and their course, being to the south, they made the island of Al Ghanam, or the island of sheep. Having taken in water they continued their voyage southward, for twelve more days, when they discovered an inhabited island, near which they saw some barks, where were red men of large stature, who conducted them to a house situated on the shore of the sea. In three days after, an Arab interpreter came to them, requesting to know the object of their voyage, and subsequently went to the king of the island to render him an account of it. The king told them that he also had sent persons to explore that vast ocean, who, after navigating it for a month towards the west, were arrested by a thick darkness and obliged to return. The Lisbon navigators, being informed that they were a month's sail from home, returned to Lisbon; where, in memory of this event, a quarter of the city received the name of Almagrurim, or the wanderers, by which

it was known in the time of Ibn-al-Wardi, who was cotemporary with Kaswini A. D. 1232.* De Guignes, who has given a general view of Ibn-al-Wardi's work, thinks that the island could not have been one of the Canaries, since the Arabs were acquainted with the western coast of Africa and frequented these islands. Others with reason suppose, that the bearings indicate that the two islands visited, during this expedition, were Madeira and one of the Canaries.

At Tus, Ghaznah, and Isfahan, Persian literature had flourished with considerable success for nearly three centuries; when, in the beginning of the thirteenth, the irruption of the inhabitants of Northern Asia, threatened to be as destructive of literature, as had been the conquest of the Goths and Vandals. The Moghals and Tartars, who, under Jenjiz Khan, rose on the frontiers of China, carried their irresistible arms over Transoxiana, and Persia; and though the barbarians could neither read nor write, Jenjiz tolerated religion and affected to respect literary men. Halaku Khan, grandson of the conqueror, assumed the sceptre of the Moghal empire, about A.D. 1257; when having made his entry into the metropolis of the Khalifat, he put the Khalif Mustassim to death. The devoted city of Baghdad was pillaged, and the feeble representative of the house of Abbas, with his kindred and officers, was sacrificed to the vengeance of the conqueror. During his auspicious reign, Persian literature flourished; and, while Sadi wrote poetry, Nasir-ad-din Tusi advanced the interests of science by his treatises on ethics and astronomy. The latter was chosen vizier by Halaku, and being a fine Greek scholar, made a translation of Euclid into Arabic, and is the author of the *Akhlak Nasari*, a translation of part of which has been published in the second volume of the Transactions of the Literary Society of Bombay. Nasir-ad-din Tusi is among the Persians a person of distinguished fame, and is author of the celebrated astronomical tables, commonly known by the name of Zij-Ilkhani; so denominated from the title of his master. According to the authority of a celebrated Persian history, the *Habib-us-Sair*, Mangu Khan, during his Chinese expeditions, acquired a taste for astronomical research, and had been long anxious to find a person who could aid him in the construction of an observatory. When circumstances soon after led him to the determination of subjecting the country west of the Oxus, instructions were given, to his brother Ha-

* See Notices et extraits des Manuscrits de la Bibliotheque du roi. Tome Deuxieme, page 25.

laku that, after reducing the strong holds belonging to the disciples of Hassan Sabah, or Old man of the mountain, Nasir-ad-din Tusi, then celebrated for his skill in astronomy, should be sent to Court. This astronomer had been liberally patronized by the governor of Maimundezh, in the Kohistan,* to whom, in A. D. 1225, he had dedicated the *Akhlak Nasiri*, a system of ethics translated from the Arabic; and, on the reduction of that fortress, he waited on the conqueror Halaku, who captivated by his talents and conversation, detained him about his own person, instead of sending him to Court according to the instructions from his brother. The conquest of Baghdad followed soon after; and Halaku, still eager in the pursuit of his favourite science, ordered the astronomer to construct an imperial observatory, on a lofty eminence near Maragah, a city of Azerbijan in Persia. In this undertaking he was armed with power to command the resources of the imperial treasury, and was soon able to bring to completion the construction of the building. It was furnished, they say, with an apparatus representing the celestial sphere, the signs of the zodiac, the conjunctions, transits, and revolutions of the heavenly bodies. The rays of the sun, admitted through a perforation in the dome, fell on certain lines of the pavement, so as to indicate, in degrees and minutes, the altitude and declination of this luminary throughout the year, marking also the time and hour of the day. The observatory was also supplied with a map of the terrestrial globe, its climates, or zones, exhibiting the several habitable regions, an outline of the ocean, and the several islands scattered over its bosom. Several celebrated mathematicians were invited, by Nasir-ad-din Tusi, to assist in the celestial observations made at this observatory; and, by order of Halaku, Muaiyid-ad-Din Alfaradi, and Yahia Ibn Almaghrabi, were ordered to give him their aid in forming the astronomical tables already mentioned. At this time an error in the mode of formerly adjusting the commencement of the new year was detected, by observing the now extraordinary difference between the sun's altitude and declination, and former recorded periods. Nasir-ad-din Tusi died A. D. 1273.

Some time prior to the death of the above celebrated astronomer, Zakaria-bin Mohammed, commonly called Kazwini, a native of Kazwin in Persian Irak, composed his geographical work, called *Asar-al-Balad-wa-Akhbar-al-Ibad*, or *the traditions of regions and the history of men*. It is a geographical and historical work, divided

* The mountainous range between Persian Irak and Khorasan.

into seven climates, and the names of cities arranged alphabetically. He also wrote a cosmographical work called *Ajaib-al-Makhlukat*, or *the wonders of created things*. In this, the author first treats of things which are above, and are the subjects of astronomical research. He speaks of the celestial spheres, and commences with the moon, of which he describes the phases and eclipses; to the influence of which he ascribes the phenomena of the tides. The milky way is also noticed, regarding the nature of which nothing is ascertained; and from this he passes to Mercury, Venus, and the Sun, the eclipses of which he accounts for. He then passes on to the notice of Mars, Jupiter, Saturn, and the fixed stars. Here he describes the southern and northern constellations, the signs of the Zodiac, and the twenty-eight mansions of the moon. He subsequently speaks of the sphere of spheres, or the empyrean, and the angels; and details the names of the Arabic, the Syro-Grecian, and Persian months and years. The work then treats of things that are below, such as the elements, the fire, the air, the water, and the terrestrial globe; next of compound things, such as minerals, plants, and animals; the extraction of mankind, with the arts of agriculture, of weaving, of building, of commerce, and a variety of other subjects. The death of Kazwini appears to have happened about the same time as that of Nasir-ad-din Tusi.

The next celebrated contributor to geography, was Abulfeda, the the historian, and chief of Hamah in Syria. After the death of his brother, Almalik-al Nasir Ahmed, who reigned at Hamah, and died in Hej. 743, A.D. 1342, Sultan Abulfeda Ismael succeeded him, and is the author of the *Takwim-al-Baldan* * or *latitudes and longitudes of places*. He was born Hej. 672, A. D. 1273; and died in Hej. 732. A. D. 1331; and is not less distinguished, among the Arabs, for the extent of his erudition than the nobility of his birth, which connects him with the distinguished family of Salah-ad-Din. His geographical tables are arranged after the order of the seven climates; the degrees of longitude and latitude of each place being given on the authority of authors whom he quotes; and among whom Ptolemy, Alfaras, Al-Biruni, and Ibn Said Almaghrabi, hold

* Takwim-al-Baldan means a Calendar of the cities. Several manuscript books of this kind, and by different authors, are to be met with. Among those, composed in modern times, is the Takwim-al-Baldan of Sadik Isfahani a translation of which has been published by the Oriental Translation Fund of Great Britain. The author was a follower of Sultan Sujah, the elder brother of Aurangzeb, and wrote a general history called Subah Sadik.

a distinguished place. The tables were written, as would appear, in A. D. 1321, and have been in part translated and published at different times. That portion of them containing the description of Mawar-an-Nahar and Arabia, will be found published, by the learned Graves, among the lesser geographers.* In his preface to the *Takwim-al-Baldan*, Abulfeda says, that though China is a great country, the information which they had concerning it was little, and that too mixed with lies; while their knowledge of Bulgaria, Circassia, Russia, Serir, Walachia, and the countries of Europe from the straits of Constantinople, was perplexed and uncertain; as they knew neither the names of the cities nor the manners of the people. The kingdoms of Nigritia, which extended to the south, were many, and divided among various tribes; among which he enumerates the Ahabash, Alzanj, Alnubah, Altakrur, Alzila, and others of which they had little account.

Among the geographical cotemporaries of Abulfeda, worthy of notice, the name of Hamdallah Mustafa, sometimes called Kazwini, deserves to be mentioned; and must not be confounded with the author of the *Ajaib-al-Mukhlukat*, whose title has been already made familiar to the reader. One of the geographical treatises written by the former is named *Ajaib-al-Baldan*, or *the wonders of towns*, which being confounded with the other cosmographical and geographical work, has led to the error of the too commonly received opinion, that both books were the work of one author.† Hamdallah Mustafa, was the son of Abi Baker, of Kazwin, who is the author of the celebrated Persian history, called the *Tarikh Guzidah*, or *select chronicle*; and his son, besides the *Ajaib-al-Baldan*, wrote an admirable geographical work, called *Nuzhat-al-Kulub*, or *recreation for hearts*, and which is frequently mentioned by Sir William Ousley.

The well known author of the physical geography, *Kharidat-al-Ajaib*, or *the pearl of marvels*, seems to have been the cotemporary of this last Kazwini, and not the former one; which confusion of names between the two authors, has led M. De Guignes, in his analysis of the work, to suppose that its author Ibn-al-Wardi was alive in A. D. 1232.‡ The Kazwini seen by Ibn-al-Wardi is therefore Hamdallah Mustafa, who lived in the 14th and not the 13th century.

* Geographiæ veteris scriptores Græci Minores, Vol. iii.

† See Chrestomathie Arabe, ou extraits de divers ecrivains Arabs, tant en prose qu'en vers. Par. A. I. Selvestre De Sacy. Tom. III. page 425.

‡ See Notices des manuscrits du roi. Tom. II. page 20.

Ibn-al-Wardî, whose name is Siraj-ad-Din, the son of Hafs Omar, wrote his work at Aleppo, and died about A. D. 1348 ; while others are of opinion that he flourished even later. The copy of his work which is in my possession, was obtained at Damascus, and contains two general maps of the world. One of them exhibits the *Bahar-al-Muhit*, or *the great ocean which surrounds the earth*, and beyond which flows the *Bahar-al-Muzlim*, or *the sea of darkness*, of which all the other seas are only gulfs. Of these he mentions the sea of Persia, which comes from the great sea on the east, and stretches from China to the sea of Kolzum, or the Red Sea. The sea of Rum, which is described to be on the west, after washing the shores of Spain and Syria is said to join the strait of Constantinople. The seas on the west or *Bahar-al-Maghrib*, the sea of Khozar, and the lake of Khawarizm, are then enumerated, along with the countries of Siklab or Slavonia, of Russia, of Bulgar, of Khozar, of Tibet, and Hajuj and Majuj on the north. His description of central Africa is curious and full of information, and he describes the great trade in salt which is carried on between the country of Maghrara on the sea and the other territories of Saudan. The second map embraces the different countries surrounding, in a circle, the holy Kaaba which is placed in the centre of the world.

A considerable portion of the geographical knowledge possessed by the Arabs, is to be met with in dictionaries, or gazetteers, in which the names of the cities are alphabetically arranged, and the longitudes and latitudes sometimes given. M. De Guignes has translated a book of this kind, namely the *Kitab Talkhis-al-asar-wa-Ajaib-al-Malik-al-Kahar*, or *an abridgement of history and the marvels of the all powerful king*, ascribed to Abd-ar-Rashid, the son of Salah, the son of Nuri, surnamed Yakuti. This is a universal geography, in which there are various details of the productions of each country, the objects of its commerce, and its minerals. The longitude and latitude of different places are frequently given, and the former is reckoned from the first meridian of the Canary islands. Some doubt exists as to the name of the author, which is said to be Bakuwi, and not Yakuti ; and, if the former reading be the correct one, he could not have lived earlier than A. D. 1403 ; as the city of Baku, on the Caspian, from which he derives his surname, was not built at an earlier period. Yakuti too is mentioned by Abulfeda, and was an inhabitant of Hamah, in Syria, who lived much anterior to this period ; and the geographical dictionary *Maajam-al-Baldan*,

of which I possess a copy, is stated in the title page, to be the work of Yakuti Alhamawi; and is very different from the work translated by M. De Guignes. In the introduction it is named *Marasid-al-Ittilaa ala-isma-il-Imkanat-wa Albukaa,** or *explanatory observations on the names of places*, and cannot be the same dictionary as the *Talkhis* already mentioned.

The latest, and not the least distinguished, of Mohammedan geographers, who, previous to the revival of learning in Europe, sustained the interests of astronomy and geography, was the grandson of Tamerlane, the celebrated Alagh Beg; who after the death of his father Shah Rukh established his Court at Samarkand. His eminent attainments in science, and more particularly in astronomy, must ever claim the attention of oriental readers; though he unhappily exhibited that superstition which was common to his countrymen, who were addicted to the absurd speculations of judicial astrology. He is the well known author of the tables of longitudes and latitudes, the *Zij-Alaghbegi*, which were published by Graves *along with those of Nasir-ad-Din Tusi. In a manuscript copy of this work, now before me, Alagh Beg gives an account of the various eras, the mode of observing the sun and stars, and the methods of ascertaining the longitudes and latitudes, and of which no notice is taken in the tables edited by Graves.

The author as would appear, constructed at Samarkand, an observatory, where there was a quadrant of great size, of which the radius was equal to the height of the cupola of St. Sophia at Constantinople; and was assisted in his astronomical observations by Salah-ad-Din Musa, otherwise named Kazi Zadai-Rumi, who was, he tells us in the preface, his first astronomical master. This person, who soon after died, was, we conclude from his name, a Greek of Constantinople; where at this time, astronomy and geography were so little attended to, that not long before Chionides, anxious to acquire a knowledge of the celestial sphere, was obliged to travel into Persia for this purpose.† He was succeeded in his office of master to the prince by Ghaias-ad-Din Jamshid, who also died before the completion of the astronomical tables; which were finished, by the assistance of Ali-Kushaji, the son of Mahommed, of whom Alagh Beg thus speaks. "I strongly hope that this report of his skill will

* In a catalogue of books, collected by the late Mr. Burckhardt, this work is said to be the production of Safi-ad-Din, the son of Abd-al-Hak. It is probable that this was his name and the other his title.

† See Transactions of the Royal Asiatic Society. Vol. II. page 372.

in a short time, extend over the world, as we have in this work detailed all that we have observed and examined, regarding luminous bodies, and have arranged the information in four chapters, trusting that the skilful, if they find mistakes will correct them, and conceal all that is not capable of emendation." The tables were completed sometime about the year 1437 ; from which period Arabic and Persian geography can be scarcely said to have an existence, as only a few minor works on this subject, compiled chiefly in India, are now to be met with. The Haft Aklim of Amin Ahmad Razi, written in 1570, is one of these works most generally known, but contains little geographical information, and is more a treatise on biography.

Though we cannot admit that the Arabs were very expert in the art of navigation, they nevertheless possessed a sufficient degree of enterprize, to occasionally forsake the beaten tract of the coasts, and seek their course through the wide ocean. Their commerce was extensive, without the assistance of the magnet ; and simply by their knowledge of the stars, they ventured to make great voyages and attempted several discoveries. They ascertained the height of the sun by instruments, and calculated the latitude of their position ; and though they have no claims as inventors, they certainly possess merit in having made their observations more skilfully, and with better instruments than the Greeks. * From Ptolemy to Copernicus astronomy and the other sciences had made little progress ; when about the end of the 15th century, the discovery of the mariners compass, the invention of printing, the voyage by the Portuguese round the Cape of Good Hope, and the flight of the remnant of the Greek sages at the capture of Constantinople, united to restore vigor to science, and to gradually diffuse that light which gave splendor to the seventeenth Century.

VIII.—*A visit, in December* 1832, *to the Carnelian Mines, situated in the Rajpeepla Hills, to the eastward of Broach.* By Lieut. George Fulljames.

I left the large and once flourishing city of Broach on the morning of the 22d December 1832, and reached the village of Sookul-

* M. De Guignes says, if in general we are curious to see how they speak of Europe which we know better than they, it will not be difficult for one to instruct himself from them on the subject of Asia, which they know better than we. Notices des manuscrits du Roi ii page 388.

teerut at 8 o'clock ; the distance from Broach seven kos. For the first four kos, the road passes through deep and dusty ravines, formed by the rush of water into the Nerbudda during the monsoon. The river evidently once flowed close to the high banks, through which the road winds. After passing the village, a highly cultivated plain opens to view, which is covered with grain of all sorts, but scarcely a tree is visible. This plain appears to me to have been at one time or other, the original bed of the river, for you have high *kunker* banks to the N. W. and cross the plain in an easterly direction ; and the soil appears to be formed of a rich alluvial sand. Sugarcane and other rich crops abound. At the village, however, large trees appear, and the river flows now nearly half a mile distant.

While we were breakfasting, our horses were ferried across the river in a flat-bottomed boat, one of the first I had seen in India. It resembles the common punt of the Severn, but has a sharp bow and stern, and does not appear to draw more than six or eight inches water. Some idea may be formed of the fertility of the soil at this village, when I mention, that the cultivators were paying twelve rupees per beegha. Sugarcane, dholl (cytisus cajan) bajra (holcus spicatus) are the objects of cultivation. From this village is seen the far famed Kubbeer Bur tree, growing on an island in the centre of the river. After breakfast we crossed the river, and, for three quarters of a mile, had to walk over its dry bed composed of fine loose sand, to the village of Minodrah, distant one and a half kos, in a direction nearly east. On approaching the village, the road is observed to be covered with pieces of agates of various colours. On inquiry we found that formerly most of the stones were worked here, but this has been discontinued, and the village in consequence is nearly deserted. I observed at a short distance from this village large lumps of scoriæ or slag, but the natives could not, or would not tell whether the slag was from copper or iron ore. I broke many pieces in hopes of discovering, but did not succeed. I think however it is from iron ore. The road passes through a very thick jungle composed of teak, &c. Between the last village and Ruttunpoor, we crossed a small river called Ruttunpoor kharee, the banks of which near that village are very steep, and covered to the edge with thick jungle. At this spot, as the strata were exposed, I could observe that the upper formation consisted of sand and kunker nodular limestone,) immediately below which occurs a compact sand

stone, in layers of from four to eight inches in depth. This latter would, I think, be found well adapted for grindstones. The sandstone is observed on both sides of the river, at about six different points above and below the village ; in the intervals, not occupied by the sandstone strata, occurs the kunker with occasionally a seam of yellow clay imbedding rounded pebbles, similar to the formation from which the carnelians are dug. The sandstone bears evident marks of having at some period been violently disturbed ; it exhibits an appearance similar to that caused by the breaking up of ice in a largeriver.

From Ruttunpoor we proceeded to the mines, distant one and a half kos, through a thick jungle. The whole road and all the nalas were strewed with agates; but these are not of a good description, and are therefore not used. To the left of the road is a high hill covered with jungle, and on the summit there is a peer's tomb. The only people residing there are a few sidees or negroes, who say that they were born and bred on the spot, whither their fathers came from Broach.

The mines that are now worked are situated on the sloping side of a small hill covered with jungle, and extend upwards of four miles. At the time there were upwards of one thousand men at work, chiefly coolees and mussulmans. Each man collects a maund and a half of good stones daily. The shafts of the mines are about four feet in diameter, so that the miners, in going up and down, do not require the assistance of ropes, &c. They cut niches in the sides of the shaft for their toes to rest upon, and by pressing their backs firmly against the sides, they in this manner ascend and descend without danger or difficulty. This I myself accomplished easily, after going down two or three mines.

The average depth of the shafts is thirty feet ; I descended into one which was thirty-eight feet. The galleries run off in every direction, or wherever the miner's fancy leads him to dig. Their height is five feet, and their width about four. The roof is arched, and the soil is a stiff clay, in which the stones are imbedded. The galleries seldom extend more than one hundred yards in length, but many of them join those of other mines. To each of the mines there are thirteen men attached, who work by turns; each man must send up so many baskets full of earth and stones, when he is relieved. All the other people are employed in sorting and trying the stones as they are brought up. They seat themselves around

the mouth of the shaft, and try each stone; which is done by chipping off a piece with another stone. From the appearance of the fracture, they are able to judge whether the stone is good or not: the finer and more compact the stone, the better it will be when burned, and the blacker it appears at first, the redder it will become after undergoing the same operation, and when ready for being cut and polished.

The stones are brought up by means of a rude roller, or pulley, supported by four pieces of wood, let into the ground. This, with a small iron pick, not steeled, in order that the miner may not be injured by the sparks, a few bamboo baskets and one rope, compose all their implements. In one mine they had tapped a spring of fresh water at thirty feet, and had been obliged to abandon it until the hot season, when, they stated, they should be able to work it again.

The strata through which the shafts are sunk appear to be all nearly alike. The superficial bed consists of gravel, then red and yellow ochre; below which Fuller's earth and ochre again, then a thin seam of rock containing a large proportion of iron, below which lies the clay in which the carnelians are imbedded.

Each miner on his return to Ruttunpoor in the evening, carries a basket full of good stones, when they are spread out on the ground and exposed to the sun. They are thus collected for a whole year, and turned over every four or five days: the longer they are exposed to the sun, the deeper, or brighter, the colour becomes when the stone is polished.

In the month of May they undergo the process of burning, which is effected by placing the stones in black earthen chatties or pots. The pot is placed with the mouth downwards, and a hole is broken in the bottom; a piece of broken pot is then placed over this hole, and the whole is covered with sheep's dung, as no other material is said to answer for fuel in this operation. The pots are arranged in single rows, and the fires, which are always lighted at sunset, are allowed to burn till sunrise; when the pots are examined, and, should there appear any white spots on the surface of the chatty, it is considered that the stones are not sufficiently burned, and they are allowed to remain for a short time longer. After this process the stones are all re-examined; those that have flaws, &c. are thrown aside, and those that are not sufficiently burned are laid by for next year's burning; the remainder are sold for exportation.

The revenue derived from the mines is very insignificant at pres-

ent; but with proper management, I should say, it might amount to something considerable, if we may judge from the custom derived by the Nuwaub of Cambay, where almost all the stones are cut and polished, and pay a heavy duty both on importation and exportation; very few, if any, stones are now cut at Broach.

It may be proper perhaps to add here a description of the process of cutting, polishing, &c. the stones, as carried on at Cambay at the present day.

The most extensive consumption of agates is required for the manufacture of beads of every variety of size and colour, which are in demand for exportation to the African and Arabian coasts, as also to the island of Zanzibar and Mozambique, where they are bartered for ivory, gold dust, Rhinoceros horns, &c.

The stones are in the first instance broken into small pieces by means of hammers, and the beads are formed, in the rough, in the following manner: An iron pin is driven into the ground with the sharp point upwards. The person operating, places the part of the stone he wishes to break on this point, and with a small hammer he strikes the stone, and continues the process until it has become partially round. This operation is performed chiefly by women, boys, or young girls. The work is then carried to another person, who proceeds with the operation. He has a large slab of hard sandstone before him, placed in a sloping or inclined position, and with a clam made of two pieces of wood, with a joint at one end, and two nails in the centre, by which the stone is held, he works the stone over the surface of the slab, constantly changing its position, so that, in a very short time it becomes round. After this it goes to the polisher, and then to the driller. The hole is drilled by means of diamond dust and water. The drill is supported on a small frame, and worked by a long bow backwards and forwards. Seals, &c. are all cut in this way, except those that require flat surfaces. This is effected by a lap made of coarse lac and koorun (country emery,) and formed into a thin wheel, two feet in diameter, supported on two pivots, and worked by a strap of leather pulled backwards and forwards. Bloodstone, agate, &c. are formed into various articles by means of sheet-iron wheels of the various diameters, worked as the others, and supplied with diamond dust and water. The carnelian beads are finished, by putting a number into a bag, in which they are shaken together.

Proceedings. November 1st 1838.

Captain D. Ross, F. R. S. President in the Chair.

I. M. Davis. Esq., W. Baxter, Esq., Lieutenant T. Postans, Lieutenant G. Jenkins, I. N. Lieutenant E. B. Eastwick, were elected members.

The following papers were presented, on the part of the Government of Bombay.

1st. Report on the weights, measures, and coins of Cabool and Bokhara. By Nowrojee Furdoonjee.

2nd. Vocabularies of the Barakee, Pashai Lagmani, Kashgari, Deer, Tirhai and Aimak languages. By Major R. Leech.

3rd. A Memoir on the River Euphrates, during the late Expedition of the H. C. Steamer "Euphrates."* By Assistant Surgeon I. W. Winchester.

The Secretary laid before the Meeting a "Report on the Geology of the Bombay Presidency, By Assistant Surgeon C. F. Collier."

Resolved, that the vocabularies, by Major Leech, of the languages spoken in the countries west of the Indus be printed in a separate form at the Society's expense, and that the offer made by Dr. Bird to superintend the printing and add explanatory notes to the paper, be thankfully accepted.

* Printed in the present number.

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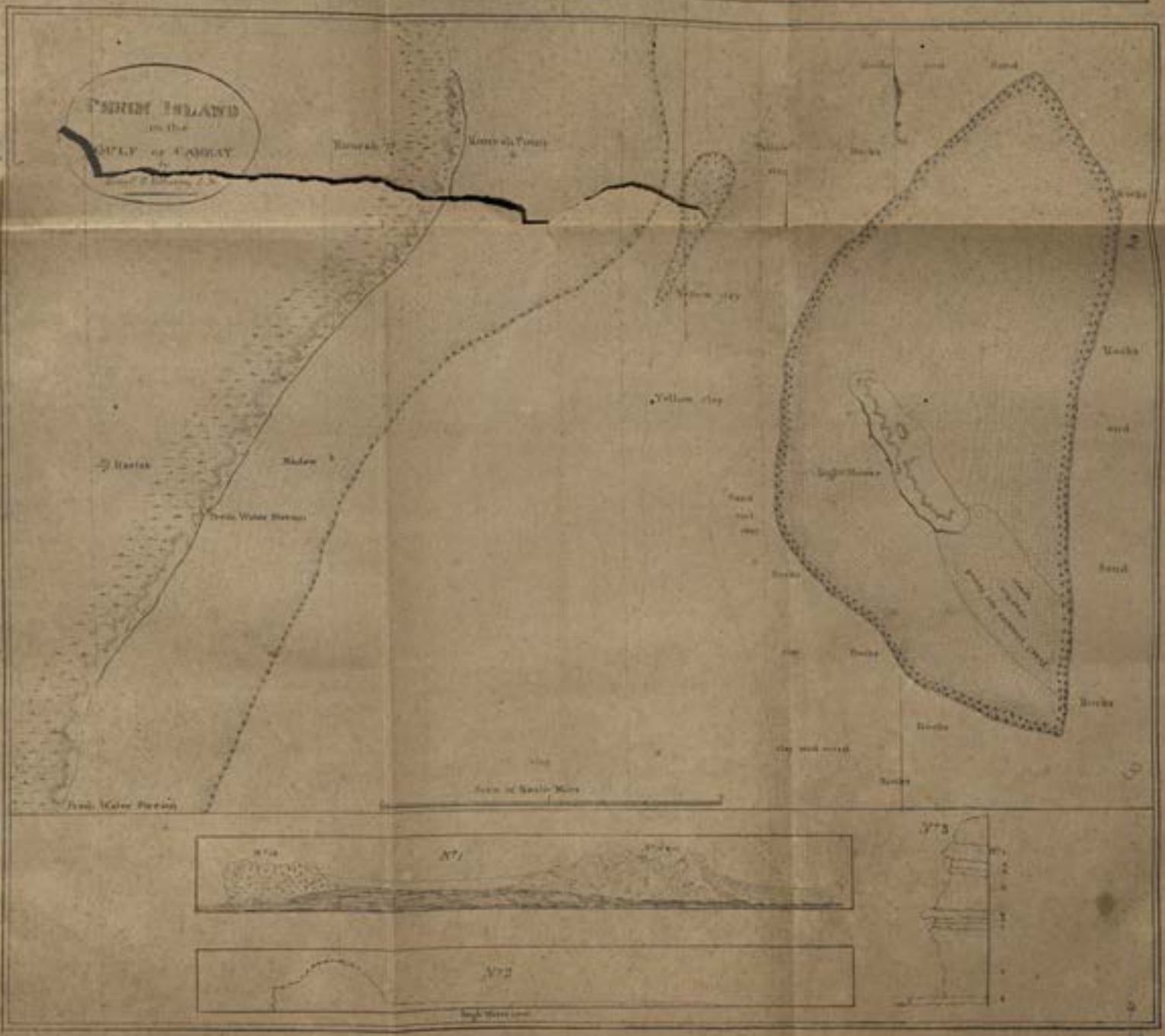
Sketch of Mullani
By
Frederick Forbes Esq
1835


PERIM ISLAND
in the
GULF of CAMBAY
Yellow clay
Yellow clay
Sand
Rocks
Rocks
Rocks

Inscriptions from Sanaa

N°1

Found on a coarse marble Slab in the City

N°2

Found on a Marble Slab in the City

N°3

Found on a Wall in the City mos[illegible]

N°4

on another Stone next to the above Inscription

N°5

More defaced

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